Department of Health and Social Security

Welsh Office

Revised 1977

HMSO £1.50 net

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HEALTH BUILDING NOTE

LAUNDRY

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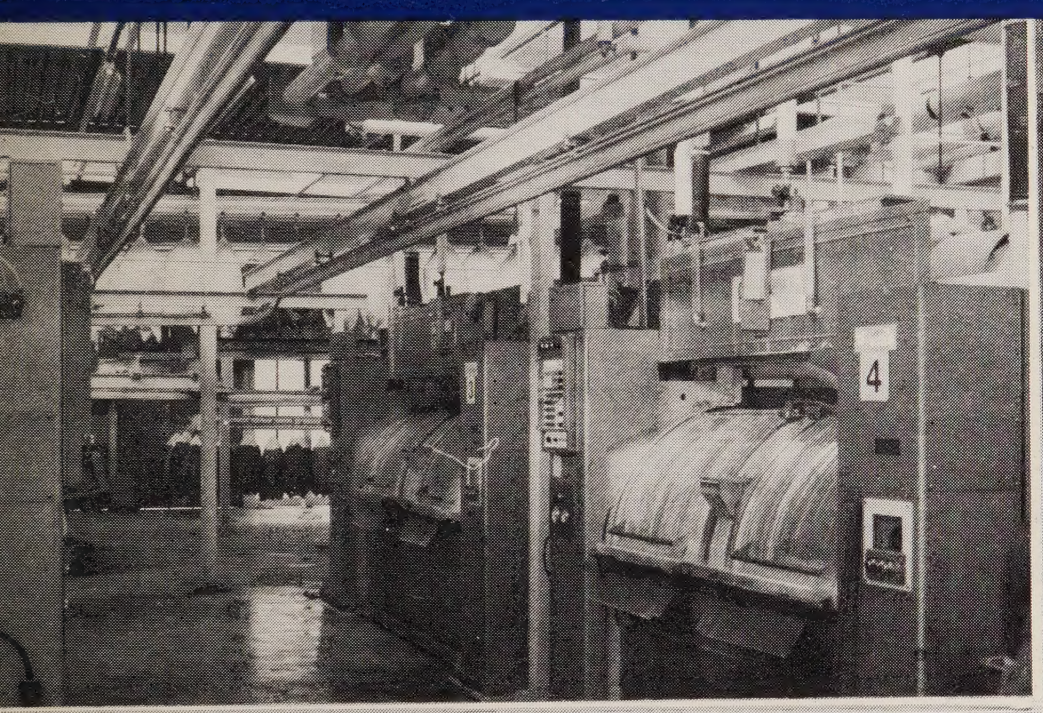

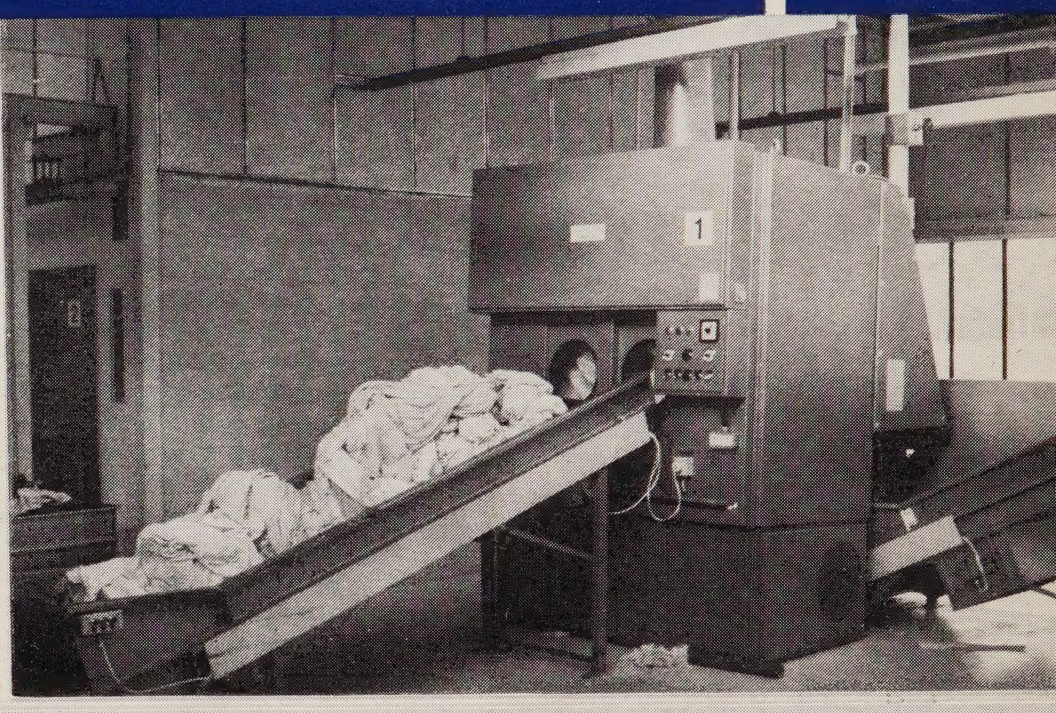

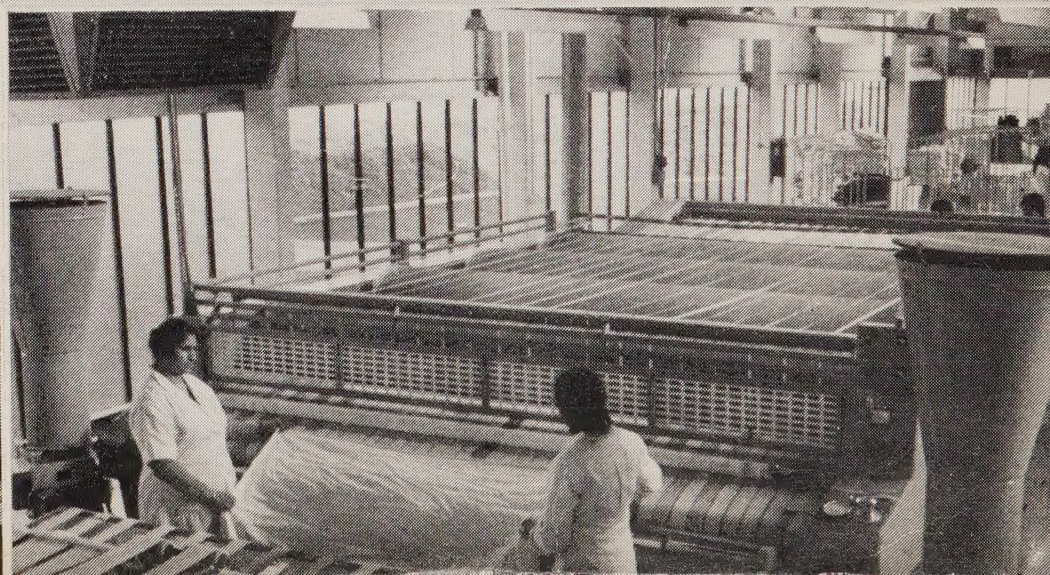

Department of Health and Social Security: London

Welsh Office: Cardiff

Health Building Note No. 25 (Revised 1977)

Laundry

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Preface

In December 1976 Regional Health Authorities were asked, in HC(76)51 to review the linen and laundry services in their Regions with Area Health Authorities, with the aims of continuing the rationalisation of laundry services as circumstances permit, and of developing the present arrangements towards the general application of a comprehensive linen service. This Health Building Note reflects the latest ideas on laundry construction and equipment and contains a large amount of new, updated and re-stated information which should prove useful to health authorities in their review. The information will be of special interest to and should be used by those authorities who may be contemplating the upgrading or re-equipping of existing laundries, particularly in the economic situation prevailing at the time of issue of this guidance when the construction of new laundries is likely to be restricted. In both the upgrading of old and the construction of new laundries health authorities must exercise the utmost economy of provision consistent with the production of a functionally adequate laundry.

The guidance is related to certain suggested dry weights and work mixes but these factors are not standard and appreciable variations will be found in practice. Thus assessments of laundry loads and decisions on the operational policies for the laundry and linen services must be made at the earliest planning stages. Selection of laundry plant will depend on factors such as methods of finishing, linen policy, fabrics to be used, policy for nurses' uniforms and the type of plant selected may need to vary from the recommendations in this Building Note in the light of decisions made on these factors. The numbers of articles weekly per staffed bed indicated in the Note have been related to good nursing practice and laundry service and pre-supposes adequate quantities of linen in circulation. The quoted norms will need to be adjusted if differing standards of provision are adopted.

The capacities of laundry described in this Note assume the maximum utilisation of the calendering flow-lines which handle about two-thirds of the total workload in terms both of numbers of articles and weight. This factor must always be borne in mind when determining laundry capacities.

1. Scope

1.1 This Building Note gives guidance on the design of laundries to process 55,000—250,000 articles during a 40-hour working week and which are staffed entirely by hospital employees. It replaces Hospital Building Note 25 originally issued in 1964 and contains amongst other matters information relating to laundry plant, disinfection requirements, spaces and dry cleaning needs.

1.2 It incorporates where appropriate, the recommendations of the Central Health Services Council's Report "Hospital Laundry Arrangements" (1959) and the subsequent recommendation of a Report on Hospital Laundry Arrangements by a Sub-Committee of the Medical Supplies Working Party Sterilisation Group Steering Committee issued with HM(71)49 (SHM 45/1971 in Scotland).

1.3 In order to implement the recommendations resulting from the Study of Health Service Laundry Organisation Group published in 1972 and 1973 guidance is also given for the provision, where required, of special laundering facilities for those items of patients' personal clothing which are unsuitable for bulk or semi-bulk processing.

2. General considerations

Initial planning factors

2.1 The provision of a new laundry or the major upgrading of an existing one entails considerable investment. Revenue expenditure over the life of the project will be in the order of 20 times the capital cost. It is therefore essential that the design will lead to (1) the most economic solution in terms of total cost (2) good management practices free from operational problems and, (3) the laundering of linen on a scale most likely to maximise the cost benefits of large capacity labour-saving processing plant. It is essential that an operational policy should be agreed with all disciplines before laundry planning commences.

2.2 In general terms cost benefits are related to the scale of laundering operations. The most economic results and full benefits in relation to costs will apply only to those sizes of laundries in which the machinery and equipment which processes the main bulk of flat work are operated at optimum levels of production. For this reason the laundry capacities covered by this Note are 55,000; 120,000; 180,000 and 250,000 articles during a 40-hour week. With an adjustment of the suggested areas for soiled storage and packing, these capacities could be increased if additional hours are worked pro-rata to the increase in working time.

2.3 The greatest cost benefits will accrue from laundries which process between 55,000 and 180,000 articles per week. Beyond these sizes the cost benefit is much reduced and it is considered that in the present state of technology a laundry having a throughput of 250,000 articles per 40-hour week represents the largest economic size.

2.4 These total capacities relate to workloads where the categories of articles which are calendered represent about two-thirds of the total number of articles to be laundered. The main objective should be to ensure that the laundry is of a size which enables all calenders to operate at optimum levels of production throughout the working week. Any variation from the proportion of calendered work will have an effect on the number of articles of laundry capacity which are regarded as producing the most economic and effective laundry sizes as stated in paragraph 2.2.

2.5 Laundries which for good reasons need to be designed for workloads which are radically different from the sizes selected for this Note will involve the installation of some machinery which is unlikely to permit the best use of labour, floor space and services generally and a correspondingly higher proportion of revenue costs can therefore be expected. Unless there are special considerations such as excessive transport costs, no new laundry having a throughput of less than 55,000 articles a week should be considered as an economic unit.

2.6 In recent years the evolution of laundry machinery and processing has resulted in increased productivity, reduced labour costs and better utilisation of water, heat, power and washing materials. New washing systems, improved mechanical handling and developments covering specialised finishing equipment, many of which are mentioned in this Note, give the planner a wider choice but lead to the need for a far more careful appraisal of the financial implications before a final choice of equipment and options is made. It is not possible to include in this document a description of all new machinery currently under development but in the planning of laundries all such developments should always be examined and where appropriate the operation of newly developed machinery should be compared with that of more conventional equipment using as necessary total cost techniques (Capital and Revenue) to determine the type of plant to be selected to provide the best economic solution.

2.7 The principal functions of a hospital laundry are (a) to cleanse by the use of thermal disinfection washing processes all fouled/infected and normally soiled linen and other garments used in hospital or health service activities and (b) to dry and finish them at the lowest cost consistent with a standard of finish acceptable for their use and within a time span which meets particular needs of user departments. In some instances these functions will incorporate special facilities for the laundering of those garments belonging to long-stay patients and other health service users which cannot be properly processed in bulk processing machines. There may also be a need for the dry cleaning of garments and furnishings.

2.8 The laundering process is one facet of a complete linen service which requires it to be linked effectively with (a) collection of soiled linen; (b) the repair of damaged and worn articles and their condemnation and replacement; (c) measuring, fitting, alteration, marking and repair of uniforms; (d) assembly, packing and distribution of the finished work to the respective users. Most of these functions are now undertaken at a hospital laundry and are covered by this Note but in order to achieve the greatest efficiency for a complete linen service careful integration and management of all functions is necessary.

2.9 Facilities for temporary storage of soiled and cleaned linen are necessary at the user's premises where means for easy loading and unloading of vehicles are as important as those provided at the laundry. A hospital's operational policies for the use, transportation and processing of linen should therefore aim at effective integration of all sections of the linen service and will require to take account of standardisation of linen, variety reduction, common usage and adequate stocks.

2.10 At sending hospitals it may also be necessary to provide space for (a) a soiled linen holding bay and (b) a clean linen store. Appendix 3 contains suggested areas for these purposes related to hospital beddage. Suitable facilities will also be required at such hospitals for loading and unloading soiled and clean linen and the requirements of paragraph 4.6 should be applied where appropriate.

Separate central disinfection area

2.11 Where a hospital laundry service is undertaken outside the National Health Service it may be necessary for the health authority to provide its own central disinfection area. This will enable fouled/infected linen from the sending hospital(s) to be sluiced where necessary and receive a disinfection wash, as recommended by the Medical Supplies Working Party's Report, before it is despatched to the commercial laundry for further processing. Any separate central disinfection area should be designed in accordance with paragraph 4.3. The floor area required for the storage of fouled/infected linen, weighing facilities, barrier-type double-door washing machines and the temporary storage of washed and disinfected linen will depend on the scale of operation. For all sizes an additional $6m^2$ will be required for the barrier room (see paragraph 4.14). The assessment of space required for a separate disinfection area to process around 2,000 kg per 40 hour week should be based on $3m^2$ per 100 kg. For processing 5,000 kg per week the area would be $2{\cdot}5m^2$ per 100 kg.

Linen and storage

2.12 Many hospitals maintain their own bulk linen stores. The introduction of a new group laundry, however, may encourage a revision of local policies and it may be decided to provide a main linen store within the laundry and eliminate individual linen stores within the central supply departments of the hospitals served. If this is the case, clean linen can be placed on free-standing, and perhaps mobile, racking direct from the finishing plant with consequent staff economy in avoiding double handling. To accommodate a main linen store, additional floor space in the packing and despatch section of the laundry will be required. As a guide, $1{\cdot}6m^2$ for every 1,000 hospital issue articles handled weekly should be allowed. The cost allowances given for this Building Note do not include any specific allowance for this additional space.

Distribution of linen

2.13 A study of the distribution of linen between laundries and hospitals has been carried out by the Study of Health Service Laundry Organisation Group. The reports which consist of the following:

(i) Laundering of Personal Clothes
(ii) Linen Supply and Distribution Systems
(iii) Disposable Substitution for Linen: Financial Implications of Introduction

were issued to health authorities in April 1972. Authorities should make full use of the information in these documents.

Fire precautions

2.14 Adequate attention must be paid to fire precautions and fire protection requirements; fire protection of the building may influence the design of the engineering services especially ventilation schemes. It is therefore essential that the local Chief Fire Officer is consulted on all fire precaution matters at the earliest possible design stage.

2.15 Tumbler dryers and tumbler-dried loads present a potential fire risk—see paragraph 6.36. Hospital authorities should display in appropriate positions instructions to employees as to the safe operation of tumbler dryers and the handling of dried loads.

2.16 Paragraphs 7.49—7.52 deal with fire alarms and fire fighting equipment. Attention must also be paid to the information in Hospital Technical Memorandum 16 (Fire Precautions) and Hospital Design Note 2 (Protection Against Fire).

Waste disposal

2.17 A collection system for waste arising in various sections of the laundry, e.g. polythene bags in the central disinfection area, will be required. A separate provision should not normally be made within the laundry complex for the disposal of rubbish; its disposal should follow normal whole hospital arrangements. In particular, local gas or electric incinerator units which require flues are not recommended because they are often overcharged resulting in incomplete combustion and objectionable residues. (See also paragraph 4.3.)

Transport

2.18 This Health Building Note does not contain any information about the vehicles which will be required for the collection and delivery service for the laundry. The provision of vehicles and their accommodation should be considered in the light of general transportation requirements for the hospital, district or area.

3. Planning and design aspects

Laundry capacity

3.1 The measure of laundry capacity used in this Note is the number of articles processed weekly, coupled with their total weight, calculated on an average weight per article of 0·4 kg ± 0·012 kg.

3.2 The average weight per article will vary between one hospital and another because of the difference in the make-up of the workload of individual hospitals, even those of similar type. In assessing the extent of the laundry facilities required for the quantity of work expressed as articles processed weekly the weight and the make-up of the workload must be considered.

3.3 If information regarding anticipated articles per staffed bed is not available, the following estimates will serve as a guide. Where known demands are in excess of these quantities, authorities should satisfy themselves that there is no excessive use of clean linen.

Type of bed	*Articles weekly per staffed bed (approximately)*
Acute (teaching and very large district general hospital)	60-70 at 0·36 kg per article
Acute and mainly acute	60 at 0·39 kg per article
Long-stay	30-40 at 0·43 kg per article
Mental illness and mental handicap	40 at 0·45 kg per article
Maternity	110 at 0·23 kg per article

NOTE: These figures will be reduced in quantity and the weight per article will tend to rise if disposables are used to any great extent.

3.4 A final assessment of the plant and machinery required for a particular laundry can be made only by compiling a list of types and quantities of articles to be laundered weekly. Against each type of article on this list may be entered its weight and the type of finish which is acceptable, e.g. calendered, tumbler dried, pressed etc. It is then possible to analyse by weight and number the quantity of work to be processed in each of the main finishing classifications. From this analysis the size, type and number of machines needed to handle the respective workloads may be determined and suitable flow-lines planned.

3.5 If in the early stages of project planning, details of the make-up of the total workload are not known, the total quantity estimated from the information in paragraph 3.3 may be subdivided by weight into about 50 per cent large flat work, 15 per cent small flat work and 22 per cent tumbler dried work. The remainder of the articles will probably represent press work. It has been assumed for the purpose of this guidance that fouled and infected linen, including babies' napkins, will comprise about 10 per cent of the total weight of all work classifications but there may well be deviations to this assumed percentage. All of these percentages are of course subject to adjustment having regard to actual requirements.

3.6 The capacity of dry cleaning units is measured in dry weight per week. Reliable statistical information regarding the amounts of cleaning generated by different types of hospital is not available and an estimate of requirements will need to be made for each project. Hospitals with a majority of medium to long-stay ambulant patients who will use their own outer clothing are likely to generate a greater need for dry cleaning facilities than other types of hospitals.

3.7 Articles of patients' personal clothing unsuitable for bulk or semi-bulk processing (see report on "Laundering of Personal Clothes" mentioned in paragraph 2.13) and for which appropriate special laundry machinery is needed (see details in Appendix 6) are additional to those included in the preceding paragraphs. In the absence of specific information an allowance per week of 7 special articles of average weight 0·23 kg per article can be added to the details given in paragraph 3.3 for each long-stay patient per week.

Siting

3.8 There may be operational advantages in siting a central laundry service near the largest user and any sterilizing services unit. Account must however be taken of the cost factors associated with the external services and the requirements of paragraph 3.12.

3.9 In the case of larger laundries an overriding consideration is the availability of labour. It is therefore essential for any laundry to be sited within easy reach of the labour supply and preferably near to public transport which serves the surrounding area.

3.10 There must be a source of water supply sufficient for the needs of the laundry and it is essential to consult the appropriate water authority on this matter. Any problems connected with the discharge of effluent must be resolved with the appropriate authority in accordance with the advice given to Regional Works Officers on 14 February 1975. Both these aspects should be dealt with at the earliest planning stage.

3.11 An adequate electric power supply must be available. The scale of standby power to be provided will be 100 per cent of the normal laundry services. (See Hospital Technical Memorandum No. 11 for laundries supplied from normal hospital emergency electrical services.)

3.12 When the laundry is within the boundary of a hospital site it should be located as near as possible to the boilerhouse and there should be easy access to the principal hospital service roads and to public roads. There should be facilities to ensure that vehicles can manoeuvre, turn round and park easily at reception and despatch stations and at all storage locations. Where the laundry is a separate industrial unit, it should be sited with convenient access to the principal main and trunk routes which serve those hospitals sending articles to the laundry. It is therefore essential to consult all local authorities about any future schemes which might have some bearing on transport facilities. The siting of the laundry complex should take into account the extent to which unwanted noise and lint deposits is likely to be transmitted to adjacent areas. When necessary space should be allowed for expansion generally as indicated in Figure 2.

Design and construction

3.13 The laundry will only function effectively if the building is planned in strict accordance with the production sequence involved through receipt, processing and dispatch. See Figure 1—Workflow Diagram. A building at one level is generally the most convenient for plant layout, services arrangement and for general administration. See Figure 2—Diagrammatic layout of Laundry—Basic Accommodation. However a mezzanine floor to accommodate storage and classification of soiled linen above the wash area can assist in the top-loading of washing machines and will reduce site coverage of the laundry.

3.14 Unloading and loading vehicles at the reception and despatch bays respectively will often be assisted by arranging the common floor level at those points to be at tail-board height. General site levels will determine how, if at all possible, this may be done, but if a change in level is possible at one end of the building only, preference should be given to the despatch bay, since clean linen will often be dispatched on trolleys which in due course are returned to the same bay when empty.

3.15 The main part of the building will be a production area to which will be attached a smaller scale element containing administrative and other supporting accommodation. An industrial-type building of light construction is suitable for the main working area whose floor should be clear and sufficiently free of structural support to avoid restriction of the layout of plant and obstruction of workflow. The structure should also permit a possible lateral extension to the building at some future date.

3.16 The design of the production area besides allowing for economical plant layout and correct work sequencies should also achieve acceptable environmental conditions for staff. While natural light and ventilation is essential it is important that solar heat gain and glare is minimised. The roof in particular should be adequately insulated and a clear height of at least 6·5m will normally be needed in the drying, calendering, and garment finishing sections, which contain the equipment producing most heat. A clear height of about 4·5m will be adequate in the wash area and 3·5m in the packing and despatch area. Ancillary accommodation should have a ceiling height of 2·7m wherever possible and nowhere should it be less than 2·4m.

3.17 The plan of the building and its cross-sectional profile should permit the introduction of clean outside air at low level from preferably both sides of the main heat producing area mentioned above. Exhausted hot air should be withdrawn via extract fans mounted on the roof above the same area and the roof constructions should provide safe access to the fans for maintenance without interference to smoke detection system. Either adjustable louvres or openable windows will also be required at high level in order that the pattern of air movement may be modified to suit varying climatic conditions.

3.18 The sub-committee's report referred to in paragraph 1.2 indicates that the separation of the whole of the reception area of the laundry from the post-washing area is no longer a requirement. It is however essential for a section of the reception area to be a central disinfection area where fouled/infected linen may be temporarily stored and loaded into washing machines. The disinfection area should be physically separated from the remainder of the reception area and from the post-wash area of the laundry. Separate reception points for soiled linen and fouled/infected linen are not essential. Advice on special washing equipment for the central disinfection area and on disinfection procedures is given in the appropriate sections of this Note.

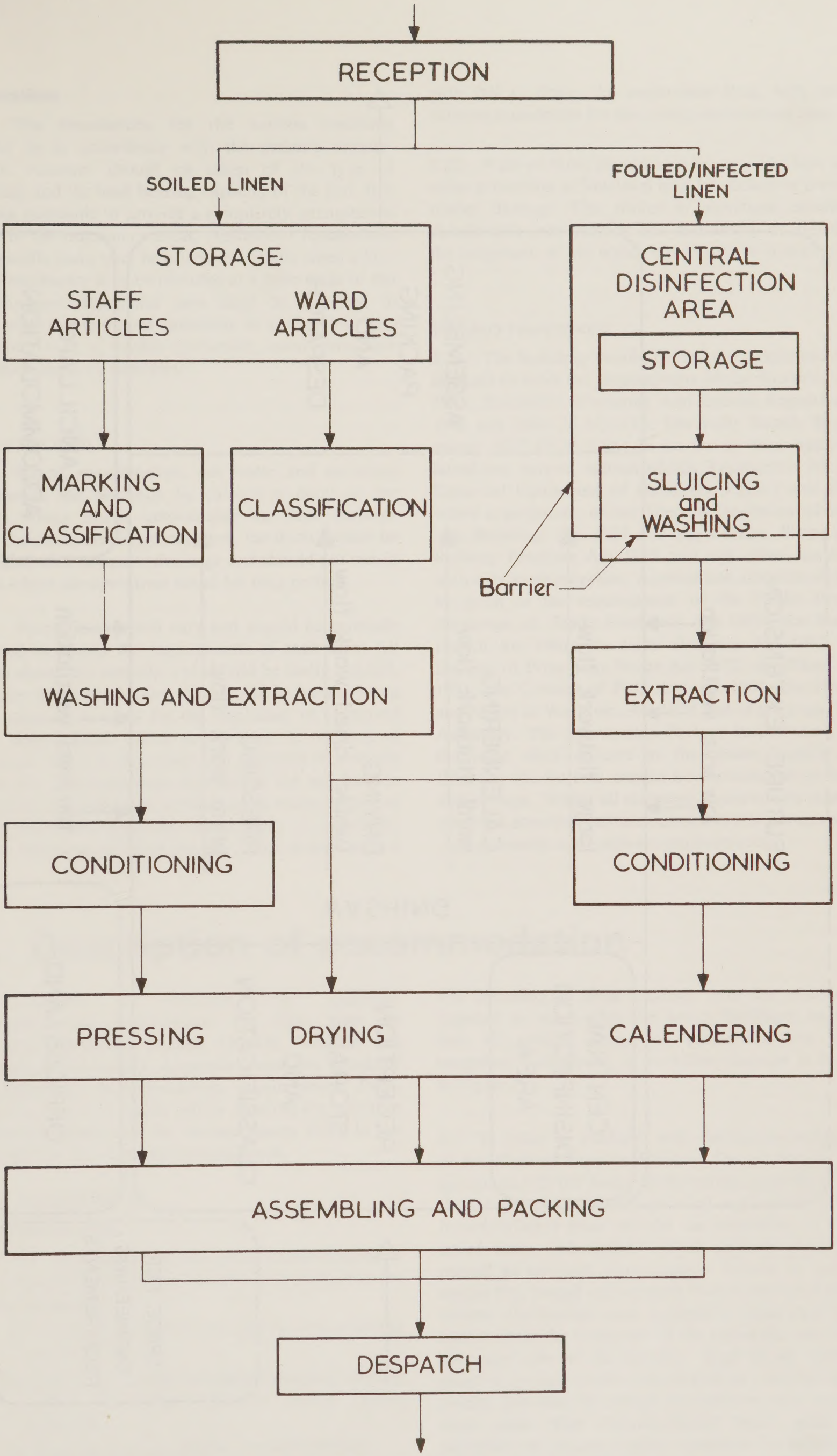

FIGURE 1 Workflow diagram

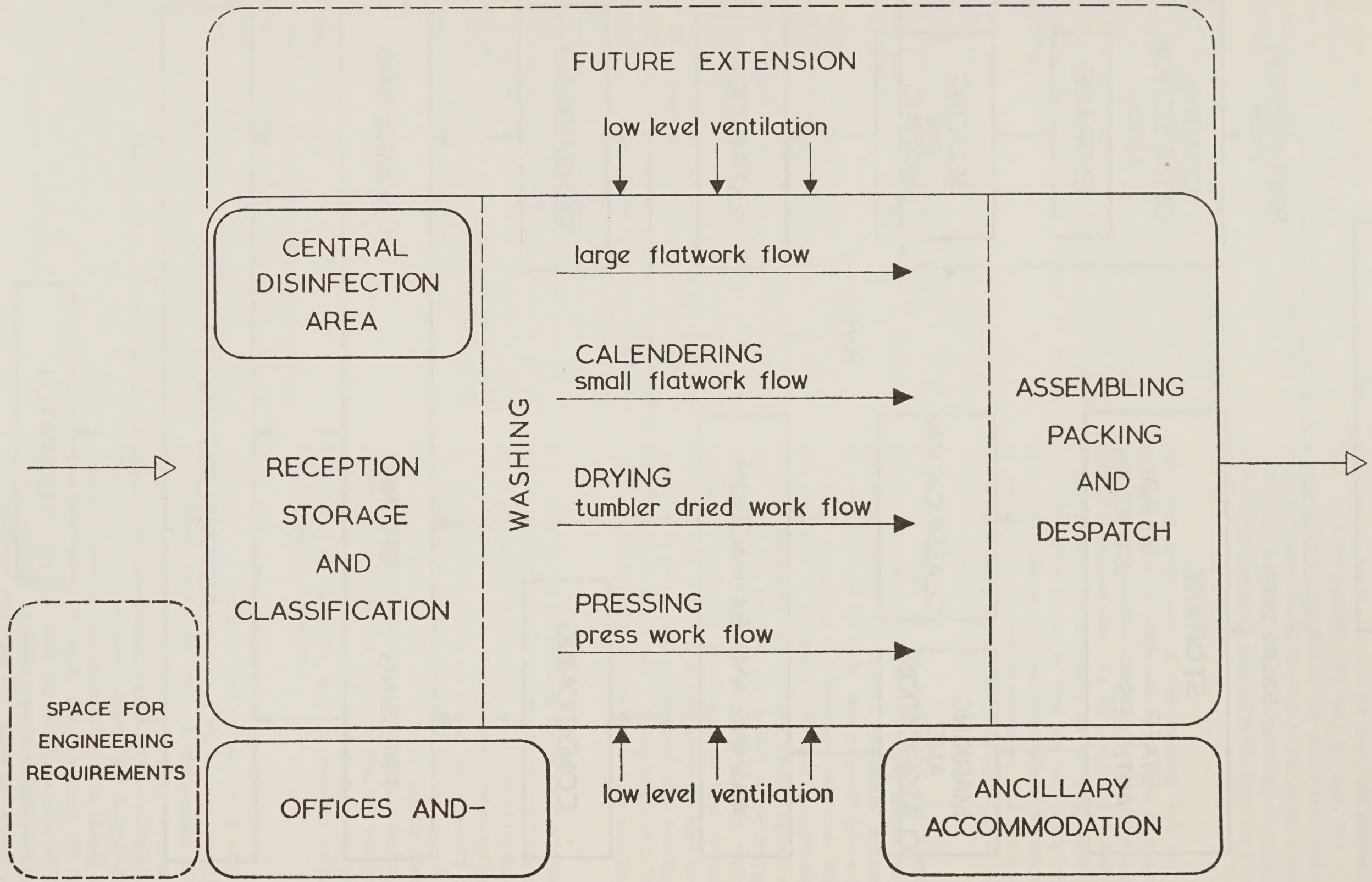

FIGURE 2 Diagrammatic layout of laundry accommodation

Foundations

3.19 The foundations for the various machines should be in accordance with the maker's requirements. Account should be taken of the type of machine and the load-bearing capacity of the soil. It is seldom economic to provide a completely strengthened floor in the machinery areas. Additional foundations for specific items may be provided initially when additional machinery is to be installed at a later stage of the development. Particular care must be exercised to deal with the vibration problems in connection with machines such as washer extractors, hydro-extractors and large capacity tumblers.

Floors and walls

3.20 Steam, condensation, hot water and extracted air should not normally be carried in ducts in the floor. Where this is unavoidable the floor surfaces over the ducts should be insulated, the ducts should be provided with adequate drainage and should not run in areas where the operatives stand for long periods.

3.21 Floor finishes will vary and should be carefully selected to satisfy the requirements of each area. All floors should be non-slip and should be easily cleaned. Finishes in the production area should be hard wearing and adequate to allow for the machinery to be moved over them without lifting or cracking. In the case of the wash area it is important that it should be non-slip when wet, and adequately drained. In the wet sections of production areas and in those areas where release of water may be occasionally unavoidable, i.e. calorifier, water softening and tank rooms, floors should be laid with fall to drain. An impervious floor with coved skirting is desirable for the central disinfection area.

3.22 Wall surfaces should also be easy to clean and some protection at low level may be needed to prevent trolley damage. The choice of structural members should take into account the desirability of avoiding the lodgement of lint which is prevalent in laundries.

Statutory requirements

3.23 The buildings should be designed, equipped and serviced to meet the requirements of the Factories Act 1961; Electricity (Factories Act) Special Regulations, 1908 and 1944 (H.M.S.O.); Electricity Supply Regulations 1937 (H.M.S.O.) in so far as they apply to laundries; current edition of the Regulations for the Electrical Equipment of Buildings (I.E.E.) and also, where appropriate, of the Thermal Insulations (Industrial Building) Act 1957 and the Offices, Shops and Railway Premises Act 1963 and any other statutory authority as appropriate. Appropriate attention should be given to the requirements of the Public Health (Drainage of Trade Premises) Act 1937; the Public Health Act 1961; the Land Drainage Act 1961; the Deposit of Poisonous Waste Act 1972; the Water Act 1973; the Control of Pollution Act 1974; the Health and Safety at Work etc. Act 1974 and of the Local Fire Authority. The appropriate Factory Inspectorate and the local chief officers at the Water Supply and Drainage Authorities should be consulted at an early design stage. Whilst all statutory requirements must be observed attention has been drawn in this paragraph to the apparently most relevant requirements.

4. Description of accommodation

4.1 Appendix 2 schedules the suggested accommodation requirements for four sizes of laundries processing 55,000, 120,000, 180,000 and 250,000 articles weekly. Appendix 3 contains details of supplementary accommodation requirements. Paragraphs 4.2 to 4.50 which follow describe the activities in and the content of the various spaces listed in the schedules of accommodation mentioned.

Basic accommodation

Production area

4.2 The main element in the basic accommodation is the production area of the laundry. This comprises the following sections:

(i) Central disinfection area (storage and washing) and extraction;

(ii) Reception, storage and classification (including space for water recovery system where required);

(iii) Washing, drying, calendering and pressing;

(iv) Assembling, packing and despatch.

The planning of these sections must be considered together to ensure that the design facilitates an easy flow of articles along the production line from reception to despatch. A workflow diagram is shown in Figure 1.

4.3 In order to conform with the recommendations of the Medical Supplies Working Party's Report (see paragraph 1.2) the design of the building and the layout should permit complete physical separation of (a) fouled/infected linen and (b) the remaining normally soiled linen. All babies' soiled napkins should be treated as infected. Arrangements should be such to ensure that fouled and infected linen is delivered into a central disinfection area completely separated by a barrier from the remainder of the soiled side and from the clean side of the laundry. Dual access washing plant of an appropriate type should be provided in the barrier between the central disinfection area and the clean side. The fouled/infected linen, with the exception of certain special categories mentioned in Appendix 1, should be received from the sending

hospitals in polythene bags or their equivalent (enclosed in an outer terylene bag) so that the contents of the bags, untouched by operators, may be tipped into the washing plant. Before it is decided to use chutes to aid the loading of washing machines the problem of disinfecting the chutes should be considered. The clean, disinfected work should be unloaded from the washing plant on the clean side of the laundry and join the normal flow of work in the finishing departments. A slop-hopper and a wash-hand basin should be provided for use in the central disinfection area. The used polythene bags should be collected together in the central disinfection area by an appropriate method and disposal determined locally by the officer responsible for the control of infection.

4.4 On reception at the laundry, articles are temporarily sorted, then sorted and classified according to the washing, re-assembling and other processes employed, and any marking required is done in this area. There are usually two main flow-lines—one for staff and patients' personal articles (other than special clothing) and one for ward and other articles.

4.5 On the clean side of the central disinfection area provision must be made for loads of mixed work to be classified for routing to the appropriate flow-lines in the finishing department. Where the quantity of fouled/infected work exceeds a flow-rate of 100 kilograms per hour particular care should be taken in planning this routing in order to ensure that the flow of work is not unduly interrupted.

4.6 It is desirable to provide an unloading dock at a level to suit off-loading of soiled linen from vehicles at the reception bay. A loading dock is also advantageous for despatch of clean linen. The unloading and loading areas should be designed to minimise draughts and provide adequate security. Covered areas with lockable shutters are recommended; external canopies should be provided over them and should project about 1.2m from the building. There should be adequate space adjacent to the unloading and loading stations to enable vehicles to manoeuvre easily and safely.

4.7 A conveyor system (see paragraph 6.2) for conveying bags of soiled linen from vehicles to space for temporary storage pending classification makes handling easier. It is desirable to keep the floor completely clear of the conveyor structure in the actual working areas but this is not essential in an area used solely for storage. There are various designs of conveyor systems for the storage and transit of classified soiled linen; some are suited for suspension from the roof; some are supported from independent columns; others combine both methods. Roof suspension of the conveyor may require local strengthening of the structure. The operating requirements and the construction costs must be integrated to obtain the lowest total cost solution. There should be separate conveyor systems for fouled/infected linen and for normally soiled linen in order to meet the requirements of paragraph 4.3.

4.8 After washing, staff articles are finished mainly by pressing or by steam/air finishing units then racked and subsequently packed in individual parcels. Ward articles etc. after washing are dealt with mainly by calendering (for sheets and other flat-work) or tumbler drying (for bath towels, cotton blankets, etc.). They are then re-assembled according to type, or in some cases destination, prior to being packed for despatch. If a central linen store is provided within or adjoining the laundry a proportion of the ward articles will be transferred to the linen store racks immediately after being calendered or dried. Otherwise, the re-assembling and packing of the clean articles will be undertaken in the packing department. An alternative to the latter arrangement sometimes used in smaller laundry units, is to pack bed linen on the delivery side of the flat-work ironing machine.

4.9 Suitable doors or removable panels (3m wide × 3m high) leading into the production area should be provided for the easy ingress or removal of plant and machinery. All floor areas between points of access and machinery foundations should be of adequate strength or capable of being temporarily strengthened or bridged.

4.10 The production area should be provided with good natural lighting, though solar glare must be avoided. The use of flexible flap doors will reduce cold draughts and door damage where trolleys are used. A small amount of space heating is necessary in cold weather for parts of the laundry where there is no processing plant radiating heat, but the main requirement is rather the provision of cool, comfortable working conditions. Generally this can be achieved by designing the building for adequate natural cross-ventilation and removing vitiated air at high level with an inflow of fresh air at low level—this is dealt with more fully under the Engineering Services section of this guidance. Normal heating and ventilation is required in non-production areas.

4.11 Where provision has to be made for laundering patients' personal clothing of the type unsuited to treatment by bulk or semi-bulk processing a small section of the main laundry will need to be allocated for this purpose.

Ancillary areas

Staff entrance

4.12 A single entrance should be provided for all staff. It should give easy access to all areas and should contain clocking-in equipment, a notice board and a GPO coin-operated telephone.

Staff lavatories and cloak-rooms

4.13 Separate changing rooms for male and female staff should be provided with sufficient space to accommodate a clothes locker for each whole-time or part-time member of the staff. Some bench seating and a full length mirror will be required. Sanitary facilities

for each sex should be provided within the area on the following basis:

Male	*Laundry capacity (in articles weekly)*
1 WC, 1 urinal, 1 lavatory basin	55,000
2 WCs, 1 urinal, 2 lavatory basins	120,000—250,000 inclusive
Female	
3 WCs, 3 lavatory basins	55,000
5 WCs, 5 lavatory basins	120,000
6 WCs, 6 lavatory basins	180,000
8 WCs, 8 lavatory basins	250,000

The WC and wash basin in the barrier room are in addition to the above schedule. It is preferable to dispose of sanitary towels by central incineration using paper sack and paper bags. Individual small incinerators cause installation and maintenance problems and should not normally be provided. However, provision should follow local hospital policies. Mirrors in the female toilet area should be located over a vanity shelf and not over a lavatory basin.

Barrier room (central disinfection area)

4.14 The movement of staff from the central disinfection area to other parts of the laundry (e.g. mess-rooms etc.) constitutes an infection risk if suitable precautions are not taken. A barrier room is therefore required and should be the only normal means of passing from the dirty to the clean side. This should have self-closing doors with a minimum of 1 WC and a lavatory basin and ventilated, divided lockers to hold in separate compartments the personal clothing and protective garments of the one or two staff working within the central disinfection area.

Mess-room

4.15 The mess-room should be able to cater for staff who wish to provide their own meals and beverages. It should be designed to accommodate at least half the total whole-time equivalent staff at one sitting. It should be equipped therefore with facilities for heating food, making hot drinks, washing-up and storing crockery, etc. A drinking water supply will be needed and a refrigerator for milk should be provided. The provision of vending machines for either food or beverages within this area may also be considered.

Rest/First aid room

4.16 A room should be provided to accommodate one person for a laundry processing 55,000 articles or 120,000 articles per week and to accommodate two persons for a laundry processing 180,000 or 250,000 articles per week. The rest room should have a bed or couch per person and one lavatory basin and be equipped as a first aid room. The siting of this room adjacent to the main toilet accommodation would be advantageous.

Offices

4.17 There should be separate offices for the laundry manager, the assistant laundry manager(s) and a general office for clerical staff. It is desirable that the office(s) of the assistant manager(s) should be sited to give easy access to and be in sight of the areas controlled by them. The Manager's office and the general office should be adjacent to each other.

Washing materials store

4.18 A lockable store should be provided immediately adjacent to the solution preparation area. Delivery vehicles should be able to off-load directly to the store. There should be storage space for at least one month's supply of materials. Most of the materials will be in heavy bags and should be stacked on a timber-slatted area.

Machine clothing store

4.19 There should be a lockable store with adequate space to accommodate materials for completely re-clothing the calenders and presses and a month's supply of wrapping materials. Calender clothing is supplied in bales 1m × 1m × 1·7m. The weight of these necessitates direct external vehicular access for off-loading and a suitable location would be adjacent to the despatch area.

Solution preparation and storage area

4.20 An area will be needed for the preparation of washing material solutions and for the storage of these solutions in tanks from which they are supplied to the washing machines. This should be located adjacent to the washing materials store and wash area. Depending upon the location, some ventilation may be necessary.

Linen repair room

4.21 This will be needed for the examination and repair of linen carried out within the laundry. It is preferable for final examination of theatre linen for tears and stains to be carried out in the laundry by suitably trained staff, and defective articles passed to the linen repair room for repair and subsequent re-wash. This room should be partitioned to separate it from the production area. An indication of the minimum accommodation suggested is given in Appendix 2 assessed on the basis of one seamstress for every 15,000 articles laundered per week and 6m^2 per sewing machine. Before a decision is made on the space and equipment required for the repair room a careful assessment should be made of actual needs in terms of the most economic and convenient system for dealing with repair of the main categories of linen, i.e. ward linen, theatre linen, uniforms and protective clothing and patients' clothing.

4.22 If a proportion of the repair work is carried out in hospital premises other than the laundry the area suggested in Appendix 2 should be reduced accordingly.

M.V. Switchroom

4.23 This room will accommodate the main circuit breaker, change-over contactor for emergency supply,

distribution switchfuse gear, metering and distribution fuse boards, etc. (see Hospital Technical Memorandum No. 7—Electrical Services Supply and Distribution). It should be designed to comply with the requirements of the Factories Act 1961 and the Memorandum on the Electricity Regulations (H.M.S.O.) to allow a clear passage of 1m in front of the panel plus additional space for withdrawing circuit breakers and 0·75m at the rear of the panel.

Electrical Distribution switch-gear room

4.24 This room should be designed to comply with the requirements of the Factories Act 1961 and the Memorandum on the Electricity Regulations (H.M.S.O.) to allow a clear passage in front of the switch-gear (which may be wall-mounted or free standing). The minimum recommended size is 2·4m long with a minimum width of 1·5m and a height of 2·4m but this will depend on the type of equipment installed. It should be kept dry and well ventilated and the door should be lockable.

Cleaners' rooms

4.25 Facilities should be provided for filling and emptying buckets and washing hand equipment by means of a shower tray and a small wall-mounted "London" sink; storage and space for mechanical cleaning equipment and cleaning utensils will be needed with shelving for cleaning materials.

Space for tanks

Header tank

4.26 A header tank with adequate static head containing approximately one hour's storage will be required to supply the washing machines. This tank may be supported by a structure above the water softening plant or near the washing machines. The areas suggested in Appendix 2 for the header tank refer to the nominal areas of a tank of 1·2m in depth.

Water recovery header tank

4.27 A header tank with adequate static head and to contain the total quantity of the last rinse water from all washing plant not having an in-built water recovery system will be required to supply the washing plant with its first "breakwash" water. This tank may be supported by a structure above the plant room or near the washing plant. The areas recommended in Appendix 2 for the recovery tank refer to the nominal areas of a tank of 1·2m in depth.

Pit for water recovery tank

4.28 A tank to contain the total quantity of the last rinse water from all washing plant not having an in-built water recovery system will be required below flow level in a pit together with duplicate pumps to transfer the recovered water to the header tank. If this pit is placed under a usable floor area adequate access must be provided both for inspection and cleaning of tank and pumps. The floor of the pit should be laid to fall to a sump in order that any water that may collect on the floor can be pumped to drain if floor is below the normal drain levels.

Additional accommodation

Water-softening plant room

4.29 If soft water of less than 50 mg/litre as $CaCO_3$ is not available, it is advisable to install water-softening plant, generally of the base exchange type, to give water of zero hardness. This plant usually comprises a break tank, water-softener, brine tank, sump and drain, and any pumps which may be necessary.

4.30 The water-softening/regeneration processes should be automatic. If circumstances necessitate a manually-operated system, the size of plant should permit regeneration daily.

Soft water storage

4.31 Where water softening is to be carried out, storage tanks, containing not less than four hours' storage, should be provided complete with pumps as required to supply the softened water to the washing machines, in addition to the header tank containing not less than one hour's storage. See paragraphs 7.30—7.32 (cold, drinking and hot water services.) The capacity of softened water storage and header tanks may be determined from the hourly water consumption tabulated in Appendix 7. Areas suggested in Appendix 2 are based on storage tanks 2·4m deep. It is now common practice to locate the larger soft water tanks at or below ground level; where the tanks providing water storage for the laundry are supported by a tower to provide the necessary pressure head, it may be satisfactory for base-exchange water-softening plant (see paragraph 4.29) to be accommodated beneath these tanks.

Salt store

4.32 Where the base-exchange system of water-softening is used, space will be required to store supplies of salt. The type of salt to be used will determine the siting, capacity and design of the store. The salt supplier should therefore be consulted at an early stage on all the technical matters involved. These will include choice of salt (based largely on the economics of supply), position and size of store in relation to vehicular access and the design of any saturator tanks that will be required if unbagged salt is to be used.

Engineers' store/workshop

4.33 Large-scale repair work should be carried out in the works department or by specialist contractors. If minor repairs, servicing and testing are to be carried out, separate work-benches for mechanical and electrical work, racks for small tools and electrical hand tools, and lockable cupboards for valuable tools and instruments will need to be provided. Storage facilities may be needed for stocks of essential spare parts.

Space for staff uniform fitting

4.34 If adjustment and fitting of staff uniforms is to be undertaken at the laundry an additional partitioned fitting area and space for hanging rails for garments awaiting alteration or despatch should be provided within the linen repair room. There must be no duplication with any similar facilities which might be provided in the staff changing area.

Circulation

4.35 The area occupied by internal walls and partitions etc. for the spaces listed under "(b) Ancillary area" of the schedule in Appendix 2 represents on average an addition of 25 per cent to the net floor area. Circulation space is included in all other spaces listed in the schedule of accommodation at Appendix 2.

Communications

Calorifier and associated plant room

4.36 This room should be used for the main steam entry to the laundry from the boiler-house, and for steam meters and headers with reducing set(s) for low-pressure steam services which might be required. It should be sited preferably on an outside wall and as near as possible to the centre of the steam load for the laundry in order to minimise the length of distribution mains. The room should be big enough to accommodate hot water storage calorifiers and any circulating pumps where central hot water service is not available.

4.37 In this plant room all steam and condensate piping and the hot water cylinders should be adequately lagged. The room should have adequate permanent natural ventilation with low-level inlet grilles or louvres and high-level outlets. Special care must be taken to ensure that calorifier tube nests can be withdrawn. A lifting eye or beam can usually be provided for this purpose at low cost when the calorifier room is built. Sufficient clear space should be allowed round each item of equipment to facilitate maintenance and servicing. Entry to the calorifier room should preferably be from the outside of the building. Guidance on the capacity of the plant to be installed is given in Appendix 7—Service Requirements. Reference should be made to Hospital Service Engineering Data Sheets Nos. DN 2.1/2, 2.3/12 and 2.13/36 (Layout of Calorifiers in Plant Rooms) and to Hospital Technical Memorandum No. 23 (Access and Accommodation for Engineering Services).

Compressor plant room

4.38 This plant room will house the air compressors and receivers. This equipment requires a large amount of natural ventilation and is noisy in operation. Because of these two factors the room should not be sited within the main envelope of the laundry. A suitable site will often be adjacent to the external water storage tanks.

Standby generator room

4.39 This plant room will house the standby generator and associated control panel. This equipment will require a large amount of natural ventilation and is usually noisy in operation. The room should not, therefore, be sited within the main envelope of the building. A suitable site will often be adjacent to the M.V. switch-room.

Standby generator oil storage tank

4.40 This oil storage tank should be sited adjacent to the generator room and installed in accordance with the guidance given in Hospital Technical Memorandum No. 11 (Emergency Electrical Services) and appropriate fire regulations.

Supplementary accommodation

Infants' napkin section

4.41 If the number of soiled infants' napkins dealt with is more than about 10,000 weekly, one of the washer extractors in the central disinfection area should be devoted exclusively to the washing of napkins. If this is done, the clean side of the napkin processing may be physically separated by a barrier from the rest of the laundry to prevent re-contamination of disinfected napkins and in this case a drying tumbler together with a conveyor may be required for delivering the finished work to packing and despatch departments.

Dry Cleaning Section

General

4.42 Dry cleaning should be undertaken only if it is certain that there will be sufficient work (generally not less than 1 tonne weekly) to keep dry cleaning equipment fully employed throughout the week. Good ventilation and natural lighting are essential. The dry cleaning plant should be of the automatic (non-flammable) enclosed type.

Production area

4.43 Appendix 3 schedules suggested accommodation requirements for four dry cleaning sections processing 600, 950, 1,450 and 2,400 kg dry weight capacity weekly. The production area must be designed to ensure easy flow of articles from reception to despatch and the plant given in Appendix 5 laid out accordingly. See paragraph 7.21 for ventilation requirements.

Dry cleaning store

4.44 The store is required for the storage of filter powder and spotting chemicals. It should have access from outside the building and should be provided with some form of permanent ventilation.

Solvent storage tank

4.45 This area is to accommodate the solvent storage tank and there should be easy access for delivery of solvent by tanker vehicle and will normally be sited outside the building.

Special Personal Clothing Section

General

4.46 If facilities are required for the laundering of those items of patients' personal clothing which are unsuitable for bulk or semi-bulk processing, additional machinery will be required. Further guidance is given in the report on "Laundering of Personal Clothing" mentioned in paragraph 2.13.

Washing, drying and finishing area

4.47 A separate room will not be needed for the accommodation of the plant scheduled in Appendix 6, but additional space will be required adjacent to the appropriate productive areas in the main laundry which will permit easy workflow from reception to despatch.

Reception and despatch

4.48 This additional space should be provided in the appropriate area in the laundry as referred to in paragraphs 4.4 and 4.11.

Storage for soiled and/or clean linen at sending hospitals

4.49 At sending hospitals it may be necessary to provide accommodation comprising (a) soiled linen holding bay and (b) a clean linen store. The areas required are given in the area schedules in Appendix 3. The areas are based on an average of 60 articles per staffed bed per week and on the assumption that four days' storage of linen will be required at any one time.

4.50 This supplementary accommodation is intended for use where the laundry undertakes to return clean linen in bulk to the sending hospital. Where this arrangement applies a reduction of the space for laundry main linen store equivalent to the area provision at the sending hospital must be made.

5. Laundry plant design

General requirements

5.1 The laundry plant should be carefully selected with the following considerations in mind:

(i) suitability for its purpose, with special reference in the case of washing plant to the type of fabric to be processed and to fulfilling the medical requirements for disinfection procedures;

(ii) economy of labour, reduction of manual effort and continuity of workflow;

(iii) economy in the consumption of water, total energy, washing materials and other consumable items;

(iv) reasonable capital costs which should be confirmed by the use of total cost techniques (capital and revenue);

(v) efficiency (under normal working conditions);

(vi) suitability for the application of automatic and mechanical aids;

(vii) reliability of design and construction, compliance with British Standards as appropriate; the provisions of the Health and Safety at work, etc. Act 1974 and all other appropriate regulations;

(viii) ease and frequency of maintenance and availability of spare parts;

(ix) satisfying the requirements of the Factories Act, especially in respect of adequate safety arrangements by way of guards around moving parts of machinery.

NOTE: It is not normally necessary to make provision for the failure of any individual item of plant. Loss of production caused by such failures and partial failures of services can be made up by overtime working.

Washing machine design

5.2 The conventional end-loading rotary washing machines continue to be economic and convenient for small classifications. For bulk washing they are being replaced by larger and more sophisticated washing units which differ both in conception and degree of automation from these conventional machines.

5.3 It is no longer possible to consider all washing machines as separate entities because very often they are part of a multiple process unit. Such units range between a group of combination washer-extractors or self-loading and/or unloading washing machines, large capacity tunnel-type continuous washing machines and large capacity continuous batch transfer machines integrated with water extraction and drying (conditioning) tumblers which minimise the need for manual labour between the various operations. Latest development in the continuous processing range is the garment on hanger washing plant.

5.4 When assessing the suitability of both conventional and more recently developed washing systems for the hospital laundry service, every care must be exercised to ensure that the system meets the medical requirements for thermal disinfection. The recommendations contained in the Medical Supplies Working Party's Report issued with HM(71)49 referred to in paragraph 1.2 of this Note, and which are relevant to categories of linen, methods of disinfection and the method of dealing with fouled/infected linen at ward level and at the laundry are detailed in Appendix 1(iii).

5.5 Washing machines must be capable of washing without imposing undue strain or wear on fabrics and

must be capable of effective stain removal. They should provide a rinsing efficiency sufficient to ensure that the net alkalinity of the effluent extracted from the articles after the final rinse is less than 10 per cent of the net washing alkalinity, always provided that the gross alkalinity of the extraction effluent does not exceed approximately 300 mg/litre expressed in terms of $CaCO_3$.

5.6 Where machines are designed to transfer the articles from one part of the process to the next this action should be possible with the minimum of trouble and manual attention. When comparing various washing machines consideration should be directed to such matters as—tendency to "roping" during the washing process; the possible need to "sour" where residual alkalinity after rinsing is too high; the moisture content of fabrics after extraction. It should be remembered that the use of pressure rolls for extraction may result in the quantity of residual water being greater than that after centrifugal or hydraulic pressure extraction and that additional heat energy will be required to evaporate this extra water. High residual moisture contents and/or high alkalinity of this residual moisture can result in "galling" and a build-up of residue on calender beds. Batch process machines usually consume power and materials related to the size of a batch, continuous processing machines may consume both power and materials irrespective of high or low rates of laundry throughput; thus to obtain the maximum benefit from continuous processing machines, they should be continuously operated at their optimum rate of production. A disadvantage of batch processing is the fluctuating demand on supplies of water, steam and power; this disadvantage is largely eliminated with a continuous washing plant which, by its nature, requires a continuous and steady supply of water, washing materials and energy in all its forms.

5.7 A true comparison of the combined capital and running costs of various complex systems can be obtained only if in each case equivalent processing equipment is included so that in terms of labour, consumption of water, energy and materials, like is compared with like.

Flat-work ironing machine design

5.8 Although the basic design of flat-work ironing machines has not changed in recent years, minor developments have contributed to more effective heat transfer and greater throughput. A calender which irons and dries 800 sheets per hour with an initial moisture content of 40 per cent of the dried weight liberates 270 kg of water vapour per hour into the laundry. This adds to ventilation problems particularly during hot weather. Therefore preference should be given to calenders which are fitted with ventilated rollers and extracts fans which permit a large proportion of this moisture being vented to the atmosphere.

5.9 Steam has always been the principal heating medium for these machines but it may be superseded by heat transfer fluids at temperatures appreciably higher than that of steam at 7 bar g. For a given throughput, fluid-heated machines would be smaller and should cost less than steam-heated machines. The use of liquid phase heating at present indicates that under certain circumstances it could be a viable alternative to the use of steam but, as yet, the system is still to be proven in the total laundry concept.

5.10 The labour content for the preparation of small flat-work for feeding into flat-work ironers continues to be high because no great advance has been made into the mechanisation of handling this class of work. Ideally, the flat-work load of a laundry should be sufficient to keep flat-work ironing machines employed at optimum throughput throughout the working week. In cases where the capacity of a multiple-roll ironing machine becomes insufficient to meet increasing demand, the installation of a small individual single-operator finishing unit can be more economic than the provision of a further multiple-roll flat-work ironing machine which would in turn involve poor utilisation of another team of operators. Full advantage should be taken of any developments of mechanised preparation, feeding, folding and stacking equipment associated with flat-work ironing where these can be shown by total cost techniques to effect material reduction in production costs.

Developments in design of garment finishing equipment

5.11 Cotton continues to be used for many garments and their finishing can be completed on a wide range of general purpose and specialised pressing and finishing machines. However there is a definite increase in the use of mixture materials such as 65/35 per cent terylene/cotton for protective clothing and uniforms and new finishing methods have been developed for garments made from these mixture materials which can result in considerable savings in finishing cost. It should be borne in mind that the styling, detailed design, material specification and general manufacturing techniques have a very important bearing on successful results being obtained from the use of special finishing equipment for garments made of these mixture materials.

5.12 Of the new finishing methods the steam air finishing tunnel appears to be the most attractive from the standpoint of high productivity per operator, but there must be a sufficient number of garments for processing to keep the machine and the operator(s) fully employed. Another method of finishing garments manufactured from mixture materials is by the use of specialised steam/air form finishers but the limitations imposed by the size and shape of the forms and their associated expanders must be kept in mind. The production per operator from these special finishers will not be so great as that obtained from the steam/air tunnel but it will be considerably more than that attained from the use of pressing machines.

5.13 Satisfactory results from these machines will depend mainly on a combined solution of all the problems presented by the factors mentioned in paragraph 5.11 and the washing processes employed, but the machines must be capable of processing the garments to provide a general appearance and surface finish which is appropriate for their particular use. By their nature, steam air finishing units liberate appreciable quantities of heat and water vapour and to ensure working conditions of reasonable comfort a properly designed hood and extraction fan capable of conducting excessive heat and moisture to atmosphere should be provided when these units are installed.

5.14 Pressing machines will be required for finishing garments made from natural fibre materials. Production rates from presses, although lower than those of the other two methods, can be maintained at a reasonable level provided the garments are designed to permit a series of easy and straightforward lays on the buck of a rotary or scissors-type press or on the expanding form of a cabinet unit. Special care will have to be exercised to minimise the tendency to glaze garments in the locality of seams or multiple thicknesses. With the change over from cotton to polyester blend materials in mind, manufacturers of cabinet pressing machines have made available special models which are capable of providing a press finish for cotton and an air blown finish for polyester blend materials. Such machines fulfill a specific need during transition periods but it is preferable to install specialised equipment in the first instance where possible.

5.15 There will no doubt be considerable development in the production of man-made fibres and their conversion into both woven and knitted fabrics of all kinds in the future; this should be kept in mind when planning the garment finishing department of any laundry. Before reaching any decision on finishing equipment, it is advisable to make a careful study of the style and material of the garments to be handled and the quality of finish likely to be acceptable.

6. Description of laundry plant

General

6.1 An indication of the main items of plant for which allowance should be made during the initial planning stage for laundries processing from 55,000 to 250,000 articles weekly is given in Appendices 4-6. The information which follows deals generally with the most important features of systems and plant. In some instances notes are given on alternative machine designs, and although these are not included in Appendices 4-6 they should not be excluded from consideration. The final choice of plant should be made on the basis of the precise requirements of the particular project and a close study of all the relevant factors.

Soiled linen reception and storage

6.2 A conveyor system for temporary storage of soiled linen in bags has many advantages. It keeps work off the floor and reduces manual handling. The system should be designed so that as bags of soiled linen are unloaded from a vehicle they may be transferred directly and conveniently to the conveyor. The storage conveyor rails should terminate at one or more stations where the contents of the bags may be discharged ready for classification. Where site area is limited, consideration may be given to arranging storage conveyors in banks one above the other and this will usually require a local increase of ceiling height.

6.3 A similar storage system can be used for the central disinfection area and the sealed water-proof packages of fouled and infected linen should be delivered to the laundry within outer bags clearly identifiable and suitable for the particular storage system adopted.

6.4 The capacity of the system should be sufficient to cope with the peak intake of soiled linen accumulated over the week-end, and to provide the reserve necessary to keep the plant fully employed. A total storage capacity of up to 8 hours unclassified and 2 hours classified soiled work should be sufficient to meet this requirement and to maintain normal production of the laundry. Additional soiled linen which accumulates during holiday week-ends may be accommodated on the floor of the storage area.

Soiled linen classification

6.5 Efficient utilisation of wash room and finishing plant depends upon a continuous supply of correctly weighed and suitably classified soiled linen being available to ensure an uninterrupted flow of work through each production flow-line. Where continuous washing plant is employed a degree of "in process" sorting may be justified. The fouled/infected linen should be tipped directly from containers (polythene bags) into the washing machines (see Appendix 1) and therefore normal classification procedure will not apply in the central disinfection area. The clean, disinfected work from washing machines in this area should be unloaded on the clean side of the laundry (hydro-extracted where conventional washing machines are employed), classified and then routed to the appropriate flow-lines in the finishing departments.

6.6 The classification system will depend to an extent on the type of washing plant to be served and whether the sorting department is on the same floor level as the washing plant or above it.

6.7 Incoming soiled linen requires initial segregation of bulk work from personal work. This should be effected at reception where personal work can be stored separately, for subsequent transit to the checking and sorting station(s). In a 55,000 articles laundry, soiled bulk work may be classified and weighed directly into loads for the washing plant, but in larger laundries it may be preferable to classify generally by type (large flat-work, small flat-work, tumble dry, etc.) and then sub-classify into weighed or measured loads in readiness for washing.

6.8 Transit of soiled work from the soiled storage area to the sorters should be by mechanical means. Facilities should be provided for transfer to the central disinfection area of bags of fouled/infected linen which are incorrectly bagged and directed to the soiled storage area. The method of transit of soiled articles to their respective classification containers will depend on the type(s) of washing system(s) employed. In the section allocated to staff and personal work, suitable marking equipment or marking machines will be necessary, but the degree of mechanical handling of marked and checked articles to their respective classification containers will depend on the quantity of work handled.

6.9 In all cases, the reserve of classified soiled linen should be sufficient for wash-room staff to call off work in readiness for recharging the batch-washing plant and to maintain a steady flow of work to continuous washing units.

6.10 This Note provides for the classification and storage of batch processing loads in weighed bags or conveyors for the 55,000 articles per week laundry and in weighing chutes for other laundry sizes. Alternative systems which may be more suited or essential for specific washing systems can be used. All systems should enable wash-room staff to identify the various categories of classified work available for washing and the weight of each batch.

Washing plant

6.11 It is not possible in this Note to provide a detailed survey of all types and varieties of washing systems which include:

(*a*) End-loading and side-loading rotary washing machines which are available as individual conventional units, or developed to provide in varying degrees, facilities for automatic loading and unloading, water recovery, and sequence operation.

(*b*) Washer-extractors, both side and end-loading, which have the advantage of combining the operations of washing, rinsing and extraction without transfer. As in the case of conventional washing machines, they may be coupled to water recovery systems and arranged for sequence operation.

(*c*) Batch transfer washing machines, which incorporate a contra-flow system and comprise a number of washing units integrated to permit progressive and automatic mechanical transfer of their loads through a series of washing and rinsing operations. These machines incorporate automatic loading and unloading. They may be operated either in conjunction with separate extractors or may be equipped with integral extractors designed for automatic loading and unloading.

(*d*) Tunnel type continuous washing machines in the form of a long horizontally disposed rotating cylindrical cage into which soiled work is automatically loaded at one end, traverses the length of the cage through wash and rinse liquors of a contra-flow system and discharges at the opposite end. At the discharge point the washed work may be conveyed automatically through pressure rolls for extracting surplus water and thence through self-loading and unloading, drying or conditioning tumbler.

(*e*) Continuous washing machines into which can be fed single items of spread flat-work which are conveyed between special feed bands through intensive washing and rinsing sections, employing a contra-flow system. Surplus water is extracted between washes and after rinsing by pressure rolls, and the work is pre-dried on heated cylinders before emerging on a conveyor which can automatically transfer the individual articles to any flat-work ironer and automatic folder. This type of machine should not be used in hospital laundries where the quantity of blood-stained linen is appreciable, but could be suitable for normally soiled work where laundry design capacity could permit its use.

6.12 The washing plant of a particular laundry will include more than one type of machine, the choice being made to provide the most economic and practical solution for the classification handled by each principal section of the workflow, namely large flat-work, small flat-work, tumble dry pressing or steam/air finishing. The type of washing plant suitable for the central disinfection area should be considered separately.

6.13 Although the use of woollen materials in the great majority of hospitals has now almost ceased, it may still be necessary to provide at least one washing machine with two-speed drive with interrupter gear for processing woollen blankets. It could also be used for sheepskins.

6.14 The capacity of individual washing units should be selected with due regard to the size and rate of output of each main classification and the corresponding sub-classification where these arise. To avoid the possibility of serious disruption of laundry services in the event of a major breakdown of plant, it is prudent not to rely on one large capacity wash unit for bulk work but to install two or more units to provide the required capacity. For this reason large integrated

washing units should not normally be considered for laundries processing less than 120,000 articles weekly unless it is envisaged that the laundry will be extended in due course.

6.15 This Note provides for washer-extractors together with continuous washing units to be included for bulk washing when appropriate, and a combination of washer-extractors and conventional washing machines with separate extractors for small classifications. For the central disinfection area, washer extractors of the double door type which can be built into a barrier partition are suggested. Washer-extractors in the central disinfection area should not be unduly sensitive to load balancing because of the impossibility of accurate sorting and weighing of fouled/infected work. To enable fouled/infected work to be tipped into these machines from polythene bag containers without handling the contents, double-door washing machines with a loading door located above the horizontal centre line will usually be the most suitable. Machines with either side-loading or end-loading doors would be suitable if the foul/infected work were contained within solubly stitched polythene bags, but these are more costly than standard welded polythene bags. The inclusion of these types of machines in the Note does not imply that other washing systems should not be examined and considered for use. Where an alternative system (a) provides a more economic solution based on the concept of total cost, (b) contributes towards meeting local labour difficulties, and (c) complies with the requirements of paragraphs 5.1, 5.4 and 5.5, the alternative should be selected.

6.16 Washing plant chosen should be of stainless steel construction for those parts which will be in contact with textiles being processed. All other parts of the machine which might be subject to corrosion by wash liquors, washing materials or condensation, should be of stainless steel or other suitable corrosion-resistant materials or treated to provide an effective resistance to corrosive attack.

6.17 A water recovery system should be provided where washing plant, for example washer-extractors, does not incorporate as an inherent feature of design a contra-flow system which conserves water and heat, for example, a range of end-loading washing machines or washer-extractors. The water recovery system should be located near the washing plant and convenient for the discharge of effluent to the sewers. Where recovery tanks are below the laundry floor level, their depth should be kept to a minimum to avoid the need for pumping effluent into sewers and to minimise the hydraulic lift for any other pumping purposes. Tanks used for recovery systems should be designed so that they may be emptied completely, can be readily cleaned from scum and so that solid material which may accumulate at the bottom of the tank can be easily removed. There must be proper access for cleaning, and the provision of duplicate recovery tanks should be considered if the design of the system does not permit easy and rapid cleaning outside the normal working hours of the washing plant. A coarse screen or strainer should be provided which can be readily inspected and cleaned, and which will collect and prevent the entry of any large pieces of waste material into the tanks, pumps or sewers. Recovery tank sizes will depend on the type of washing system with which they are associated. In the case of laundries equipped partly with washer-extractors for processing bulk work it is unlikely that a recovery unit will be economic for laundries processing less than 90,000 articles weekly. Effluent from washing machines in the central disinfection area must not be connected to a water recovery system; recovered water from other washing machines, however, may be used for sluicing and washing in this area.

6.18 Washing machines of the batch type should be equipped with automatic process controls. Two types in particular of the many automatic controls have proved suitable for hospital laundries. One is a time-based control which needs water supply at a constant head. The other is mainly operated by a volumetric control system. Both usually rely on control of the steam supply by thermostat and some designs delay the timing of different parts of the washing and rinsing process until the correct quantity of water has entered the machine or until the required temperature has been reached. The delay system is of particular value in ensuring that the necessary temperature-time relationship for disinfection during part of the washing process is achieved. Both types of automatic controls normally require supplies of washing materials in liquid form. Such supplies normally require facilities for mixing and storage of stock solutions. For some controls the position of solution tanks and their static head is important. The automatic washing controls of a series of washing machines or washer-extractors should incorporate a sequencing device which will promote successive loading and unloading of all machines and at the same time minimise peak demands for water, steam and electric power. Continuous washing machines have automatic controls and supply systems suited to their particular design.

6.19 In accordance with Appendix 1 of this Note, all washing plants should provide a washing process which includes a disinfecting stage in which the temperature is maintained at 65°C for 10 minutes or 71°C for 3 minutes. For small machines of conventional design and degrees of loading, 4 minutes should be added to these times to allow for "mixing time". For large capacity machines or heavy degrees of loading it may be necessary to add up to 8 minutes for "mixing time". "Mixing time" is regarded as the time taken to reach 95 per cent complete mixing of detergent with the load from the time at which the detergent is introduced into the washing machine. For special categories the washing plant in the central disinfection area should also be capable of providing a washing temperature of 93°C for 10 minutes to which should be added the mixing time. The importance of temperature in disinfection procedures requires

machines to be provided with reliable thermometers, preferably of the mercury in steel type with the sensing element immersed in a position which will not give a false reading. Continuous washing machines and other machines of new design which incorporate new washing processes, should be considered individually to determine satisfactory thermal disinfecting conditions for each type and to ensure that there is no possibility of any excessive re-contamination after the disinfection stage. Means for regular thermal disinfection of the cool end of continuous washing machines should be incorporated so that the machine may be properly disinfected before the processing of linen is commenced.

Extractors

6.20 After washing, surplus water may be removed from textiles by centrifugal hydro-extractors, hydraulic pressure extractors, pressure rolls or membrane pressure squeezers. This Note provides for the use of hydro-extractors in conjunction with small capacity washing machines in the Personal Clothing Section and pressure rolls for continuous washing units. Other methods may be more appropriate for other washing systems. Generally the centrifugal hydro-extractor should have a direct electrical drive.

6.21 There are two satisfactory methods of substantially reducing the manual effort required in loading and unloading extractors:

(*a*) the nylon sling/electric hoist system; and

(*b*) the flat belt conveyor.

An advantage of the nylon sling system is that it can be extended so that the loads can be lifted from the hydro-extractors and conveyed on it to the drying and conditioning tumblers. If an electric hoist system and overhead conveyor is used for loading/unloading hydro-extractors the gantry should be supported from columns rather than the roof.

6.22 Hydraulic pressure extractors with capacities of 50 kg or 100 kg per charge may be more suited to some layouts. Used in conjunction with flat belt conveyors and overhead sling systems they require little manual effort to load, while transfer of the cylindrical packs of extracted work is readily effected either by special trolleys, inclined roller conveyors or an overhead conveyor system.

6.23 Pressure rolls are mainly used as part of a continuous washing system, but their extraction efficiency is usually lower than that of centrifugal or hydraulic pressure machines.

Conditioning plant

6.24 To enable high rates of production to be obtained from flat-work ironing machines, pressing machines and other finishing units, it is often necessary to reduce further the moisture retained by articles after mechanical extraction and to break up the compacted loads from extractors into easily handled individual articles. This process is known as conditioning.

6.25 Conventional drying tumblers for this inter-process operation have been replaced by purpose-built conditioners. Some are designed to handle batch loads intermittently and others provide a continuous throughput. All have means for automatic loading and unloading of articles; some have specially developed conveyor systems for delivering supplies of conditioned sheets to one or more feeding stations of a flat-work spreading and feeding machine. Good insulation of the outer casing of these machines is necessary to minimise radiation of heat.

6.26 When assessing the total evaporative requirement of conditioning plant, consideration has to be given to the proportion of residual moisture which results from the various types of extractors. The residual moisture content of cotton fabric after centrifugal extraction is normally 50 per cent or less of its bone-dry weight. The residual moisture content would be higher from other methods of extraction.

Flat-work preparation

6.27 Mechanical aids to spreading and feeding are essential to achieve the efficient operation of a high speed calender on large flat-work production. The several types available include a fan-shaped spreader which should be used in conjunction with a feeding aid whose action is to remove creases and automatically control the feeding without further assistance from operators immediately after the leading edge of the article is placed on the calender feed-bands and held. This feeding aid, which fits closely to the calender and occupies little floor space, may rely on suction fans for its operation or upon mechanical means of spreading and tensioning.

6.28 Another type, which has been developed to contribute towards higher feeding rates, provides for the spreading of large pieces of flat-work which are fed alternately by operators stationed at both sides of the feeding machines or by two or three operators stationed in front of the feeding machine. In some designs, automatic transfer from this spreading unit to the ironing machine feed-bands is included. The development of high-speed feeding machines is being actively pursued by manufacturers, and while some new feeding devices are not yet in a sufficiently advanced stage to be mentioned in this Note, their development should be kept constantly under review for future consideration.

6.29 Flat articles, other than large ones, will need to be dealt with on a separate ironing machine in the larger laundries and should be prepared for feeding at high speed. If a high speed machine is used for calendering flat articles other than large ones, ample space should be provided adjacent to the ironing machine for the necessary preparation. It can be advantageous to install special preparing equipment for small articles in some cases.

Flat-work ironing machines (calenders)

6.30 In recent years deep-bed machines of unit construction have been an outstanding feature of British laundry machinery development. The rolls are usually about 600mm diameter (some machines have larger diameter rolls) and since they are not capable of floating (lifting) to the extent possible on earlier machines with smaller rollers, spring padding is usually fitted. Further aids to output are suction and/or high pressure steam for the rollers and "gap pieces" fitted between the beds. The deep-bed type of machine is reliable and efficient combining good output, high quality of the product and minimum space requirements. Consideration of other types of ironing machines or alternative heating mediums mentioned in paragraph 5.9 should not however be excluded provided they are equally suitable and efficient. Heat emission from these machines can be considerable and to assist comfortable working conditions there should be efficient lagging of beds, gap pieces, steam and condensate pipes and fittings. Heat-deflecting guards should be fitted wherever possible.

Flat-work folding machines

6.31 For efficient operation of flat-work ironing machines, automatic folding equipment is essential. There are two principal types of flat-work folding machines. The first type produces lateral folds and can be suitable for folding a single lane of large flat-work or a number of lanes of small flat-work. Some designs provide for switching from single lane operation to any combination of the multiple lanes, thus permitting the machine to handle various widths of flat-work. The second type produces cross folds and is coupled to the first type thus enabling the entire folding operation to be completely automatic.

6.32 Where folders are used, it will be necessary to examine large articles for rejection or repair either (a) during preparation, or (b) whilst feeding the calender, a finger-tip control being fitted at the feeding end of the calender to enable a sub-standard article to bypass the folding mechanism at the other end. Normally it will be possible to reject sub-standard small flat-work during its preparation.

6.33 Because of the differences in the make-up of articles between laundries, the folding equipment specified in Appendix 4 should be regarded as a guide only. In some instances the specialisation of flat-work flow-lines may warrant the use of stacking machines. For a particular laundry, details of the number and size of flat-work articles to be dealt with on folding machines should be established so that the mechanical folding requirements may be specified to meet the particular needs of any user.

Drying plant

6.34 The processes of complete drying are now carried out by drying tumblers. Although static drying plant, which was at one time widely used, may be more satisfactory for woollen articles because of the reduced risk of shrinkage, it should not now be used owing to the amount of space which such plant occupies and the labour needed to handle individual articles. Shrink-resistant materials will withstand tumbler drying more satisfactorily than untreated materials and the case for static dryers is not a strong one. A possible exception is the use of small heated cabinets for drying a limited quantity of drip-dry garments arising in the special section dealing with patients' personal clothing. The use of cellular cotton blankets has resulted in considerable reduction in the amount of woollen articles requiring laundering, but where the use of woollen blankets is preferred, reference should be made to the Joint Report of the Wool Secretariat and the British Launderers Research Association "High Temperature Laundering of Hospital Woollen Blankets" (1959). It is important to ensure that drying tumblers intended for drying articles other than cotton are thermostatically controlled two-speed machines which will permit woollens and other textiles prone to shrinkage to be dried at temperatures lower than those permitted for cotton, and with less mechanical action. Where continuous process washing plant is employed, conditioning tumblers form part of an integrated flowline.

6.35 Conventional end-loading tumblers, designed for manual loading and unloading, are suitable for handling loads of up to 45 kg. For larger loads, self-unloading tumblers which partially reduce manual labour, or self-loading and unloading tumblers which practically eliminate manual labour are more economic.

6.36 Tumblers should be positioned so that operators engaged on folding fully dried articles can deal with them immediately the tumbler is unloaded. By so doing, the risk of spontaneous ignition will be eliminated, undesirable creasing will be minimised and the quality improved. Fire risk from bulk loads of hot dried work is a very real one and tumblers designed for manual unloading which provide means for cooling hot loads of dried cotton articles are preferred. There is a special need for a cooling cycle on tumblers used for polyester fabrics.

6.37 Provided there are sufficient quantities (i.e. 1,000 or more per hour) of standardised articles such as towels and napkins, the use of a mechanical folding and stacking machine for tumbler-dried work can be economic. Such machines can sometimes be used with advantage to fold small standardised articles which have been calendered. Their use cannot be justified unless there are sufficiently large quantities and there is a high degree of standardisation of article size and weight.

Pressing and finishing

6.38 The wider and ever increasing use of polyester/cotton and other synthetic and mixture materials greatly influence the selection of equipment in the garment finishing section. It is therefore necessary to consider future requirements and the changes likely to occur in the period between the design concept

and commissioning of the laundry. The final choice of finishing equipment should therefore be deferred to the latest possible stage, and flexibility allowed for in provisional layout of plant and engineering services to accommodate possible changes in equipment.

6.39 Presses commonly used in laundries may be divided into three classes; (a) scissors presses; (b) those having twin tables and clothed bucks which, when rotated, close alternately on a fixed polished head; and (c) "cabinet" presses having special clothed forms, shaped to suit specific types of garments and which retract between polished heads or plattens within a cabinet. In terms of output, one rotating table press is roughly equivalent to a pair of scissors presses. Both types may be designed either for general utility service or for special purposes.

6.40 A major advantage of larger laundries is that large quantities of certain articles such as white coats and jackets justify the use of specialised cabinet units. These usually comprise a group of cabinet and scissors presses on which specific parts of a garment are finished in sequence. Often these units incorporate a garment folding machine. Cabinet units are capable of raising operator production by 100 per cent or more above that obtainable from general utility presses and they do not require such highly skilled operators.

6.41 There are limits to which the forms of cabinet presses can be self-adjusting to size and shape of various parts of garments and these need to be considered when selecting cabinet units to deal with the range of garments which will require finishing.

6.42 All types of pressing machines need to be properly insulated in order to minimise heat radiation.

6.43 The cost per article for press finishing is very high compared with other finishing processes. It is essential, therefore, to make an accurate and detailed assessment of the press-work load to ensure that the maximum number of articles is processed by special purpose presses and by cabinet units in order to keep labour costs at a minimum. The aim should be to obviate hand ironing entirely; where it is impractical to machine finish uniforms and other clothing because of their design or their materials, the amount of hand ironing should be kept to the lowest possible level.

6.44 This Note includes the provision of two types of finishing plant for garments made from mixture materials. The first is the steam/air finisher on which single garments are dressed on a form provided with expanders which tension the garment prior to steaming and subsequent drying by hot air. The second is a cabinet through which garments are conveyed continuously on hangers first through a steaming chamber which relaxes the fabric and then through a drying chamber in which very hot air is circulated at high velocity. It may be necessary for garments to be dried partially in a drying tumbler before passing them through the finishing machine, otherwise proper drying of multiple thickness of pockets, cuffs, lapels and hems will not take place because of high production rates.

6.45 Where the amount of small flat-work to be processed is greater than the capacity of one or more calenders but the excess does not warrant the provision of an additional calender, pillow-cases and other flat-work of similar size may be finished on a continuous small-work pressing machine. These pressing machines permit both preparation and feeding by one operator and can incorporate an auxiliary folding and stacking unit.

6.46 On occasions there may be sufficient woollen garments to justify the provision of a Hoffman or valet press. This type has a padded head and is of the "scissors" pattern but manually operated. These are the types of presses mentioned in Appendix 6.

6.47 In view of the present recommendations for the design of nurses' uniforms which exclude the use of starched collars this Note does not include the provision of collar polishing machines and they should not be installed unless local requirements make them essential.

Conveyors

6.48 Articles may be moved to press units by conveyors and the pressed articles may be conveyed to the racking department by similar means. The increasing use of cabinet units and steam/air finishers makes the use of conveyors in the garment finishing section less appropriate since the garments are presented to the units on special stands or trolleys and some of the finished garments are placed on garment hangers for transfer to the despatch section. If flat-belt conveyors are used in the press room and other departments, it is important that they do not unduly restrict the movement of laundry staff. Conveyors are sometimes needed for transport of work between washing plant, conditioning plant, flat-work ironers and drying tumblers with provision for buffer stocks where necessary. All conveyors must be designed with care to ensure that flexibility of work movement is not impaired.

6.49 A well arranged flat-belt or gravity roller conveyor system can usually be used with advantage in the packing department for conveying clean linen containers to the despatch section, or to the vans.

Racking and packing

6.50 Racking and packing is closely associated with storage and distribution and these aspects should be studied together in planning the laundry. The reports mentioned in paragraph 2.13 should be used in the design of this section of the laundry.

6.51 The organisation of laundered ward linen supplies will depend on whether a hospital has its own linen supply or whether a pooled linen service is in

operation. The former requires more complex racking, packing and distribution arrangements at the laundry and should not, therefore, be used if possible. Where practicable a pooled linen service which greatly simplifies the handling of linen stocks should be adopted.

6.52 A pooled linen service allows improved methods of packing ward linen direct from the laundry production lines into mobile units which can be easily loaded into transport vehicles. These mobile units can be in the form of containers designed to carry specific quantities of articles such as sheets and towels and to be stacked on a pallet or trolley; there may also be mobile racks designed to hold specific packs or articles or made up to suit ward unit requirements. Transport vehicles should be designed for convenient and economic storage of such mobile units.

6.53 The practice of wrapping and bagging personal laundry and packages of laundered linen in polythene film is increasing. The justification of the capital needed for machines and equipment for this purpose should not be based solely on hygienic and aesthetic considerations. The total cost, which should include all capital charges, labour, running costs, maintenance and consumption of polythene film, will need to be set against possible savings on handling, storage and distribution, and in the elimination of other forms of packaging, e.g. boxes. A reduction in the loss risk by sealed packaging should also be taken into account.

Dry cleaning equipment

6.54 Dry cleaning machines of the non-flammable type equipped with automatic control are recommended. Their range of sizes makes it possible to design dry cleaning units which can operate economically for the workloads detailed in the schedule of Appendix 5. New developments in dry cleaning machines have provided what is termed a "dual phase" machine which incorporates wash sequence prior to the dry cleaning cycle. This machine must be carefully evaluated before any decision is made to incorporate this type of machine in a dry cleaning unit. When selecting dry cleaning machines the general requirements of paragraph 5.1 are applicable.

6.55 Simple spotting table(s) and spotting equipment for the removal of resistant stains also provide a convenient garment inspection point.

6.56 The needs in the finishing department can be met by general garment presses with free steam facilities and steam/air form finishers. Specialised finishing equipment for a particular type of article should not be installed unless its provision can be justified on economic grounds by virtue of the quantity of work involved. In larger dry cleaning units the use of steam/air finishing units may be justified particularly if they can also be used for wet-cleaned articles.

6.57 In most dry cleaning units there is no need for complete garment conveyor systems but well designed slip-rails can be used with advantage.

6.58 An activated carbon solvent recovery unit should be provided. This reduces solvent losses and removes and partially recovers heavier than air solvent vapour which might collect at low level in the dry cleaning section.

Special personal clothing section

6.59 The majority of patients' clothing can be processed satisfactorily in the main washing, drying and finishing units. Where the laundry is required to process work from a large number of long-stay patients, a small proportion of garments may not be suited to bulk or semi-bulk processing and small capacity washing, drying and finishing units should be provided for this purpose.

6.60 These small units should be installed in the main laundry in such a way that the workflow can be partially integrated with the main garment processing sections of the laundry and thus provide flexibility in the use of machines and employment of staff.

6.61 Machinery selected should be suitable for the workload and should include a soiled work classifier, hand-washing sink with draining board; spin-drier; washing machine(s) of about 10kg capacity with spin-drying incorporated; drying tumbler of 10 to 12kg capacity; drying cabinet for drip-dry garments with hanging rails and racks; steam air finisher and provision for racking finished work.

7. Engineering services

7.1 Engineering services should be designed to ensure ease of maintenance with the minimum interruption of services. Meters for costing purposes will be required for steam, cold water, electricity and gas, and also for hot water if it is taken from the hospital supply.

Mechanical services

Heating and ventilation

General requirements

7.2 The design of the heating system should be based on the temperatures and ventilation rates given in Table 1, the outside temperature being assumed to be minus 1°C.

TABLE 1	*Temperature °C*	*Air changes per hour*
Mess room, rest room, linen repair room, cloakrooms and offices	20	2
Main linen store, assembling, packing and despatch areas, engineers' store, barrier room, cleaners' room, corridors and lavatories	16	2 ø
Staff entrance	16	3
Reception, storage and classification	16	15/20*
Central disinfection area	16	20
Washing, calendering, drying and pressing	—	— †
Dry cleaning	16	10/15*
Laundry stores	10	½
Special personal clothing section as corresponding production areas		
M.V. switch-room, electrical distribution switchgear room, water softening plant room, calorifier and associated plant rooms, compressor plant room and standby generator room	—	2

NOTES:

øSee also paragraph 7.22.

*The higher figure should be used if the ceiling is flat and less than 4·2m from the floor. The lower figure should be used if the ceiling is 4·2m or more from the floor.

†See paragraphs 7.8—7.20.

7.3 Fire protection of the building may influence the design of the engineering services, especially ventilation schemes. The local Chief Fire Officer should be consulted about these matters at the earliest possible planning stage and all current statutory requirements must be followed. (See also paragraphs 2.14—2.16.)

Heating

7.4 The temperatures indicated in paragraph 7.2 will be met quite adequately by the use of low pressure steam convectors and unit heaters and by the use of radiant panels in the loading and unloading areas. Steam is available for laundry purposes and a system of this type may be more easily installed than a low-pressure hot water radiator system.

7.5 In the wash area there is relatively little heat radiation but in calendering, drying and pressing areas, there is considerable heat radiation from the machines and it is rarely necessary to provide general space heating.

7.6 Low-speed fan-assisted low-pressure steam unit heaters, using external air may be placed near the entrance doors of the reception, sorting and classification area for the soiled side and for the central disinfection area, while those for the packing and despatch room may use re-circulated air to prevent cold draughts through open doors during unloading and loading operations.

7.7 The heating system should be designed to provide frost protection when the laundry is not in use. All heating appliances should be easily accessible for cleaning because of the amount of lint and dust carried in the air of a laundry.

Ventilation

7.8 The major aspects of the design of the ventilation system for the production area are the removal of process heat and solar gains particularly during the summer and the need to satisfy the requirements of the Factories Act in regard to minimum temperatures during the winter.

7.9 For the design of laundries covered in this Note a general extract ventilation system augmented by local supply air systems which serve air using plant, i.e. tumblers, etc., and dispensed in such a way as to off-set localised heat gains at operator positions is preferred. In this connection a minimum height of 6·5m to the eaves of that part of the building which accommodates drying tumblers, calenders and garment finishing equipment is considered necessary to achieve a satisfactory operator environment. Experience has shown that a roof pitch of a minimum of 10° is the optimum necessary to avoid the formation of stagnant pockets of hot air without incurring weathering and maintenance problems with the extract fans.

7.10 The volume of air extracted from the production area must be sufficient to remove the heat gain from ALL sources. Air exhausted to atmosphere from drying tumblers and calenders may represent 20 to 25 per cent of the total air volume required for ventilation purposes and this needs to be considered in the design of any system.

7.11 Fresh air for the general extract system may be admitted through wall-mounted adjustable louvres with protection against ingress of birds and sited so that they are easily accessible for cleaning and servicing. These louvres should be located along the external walls so that in summer air can be admitted at the lowest possible level and in winter at the highest possible level. The ratio of the area of the low level

louvres to the area of the high level louvres should be in the order of 2:1. Design velocities of 77cm/sec—127cm/sec should be satisfactory.

7.12 Mechanical extract fans in the calendering and garment finishing areas should be roof-mounted above the principal heat-emitting equipment. Extract fans in the washing area should be so located and sized as to draw approximately $\frac{1}{3}$ of the air to be extracted from the finishing area, thus providing heat in winter and reducing the humidity. To ensure reasonable working conditions when high ambient temperatures prevail in summer, the capacity of the extract fans together with the amount of air exhausted by the drying tumblers and calenders should provide a maximum differential of 5°C—7°C between inlet and extract in the finishing areas of the laundry.

7.13 Where operators are required to work in areas of high heat radiation, e.g. calendering, pressing and garment finishing, a separate personalised input ventilation system is required whereby the air inlets can be adjusted by the machine operator to suit individual needs. This system can comprise one or more fan and heater units equipped with filters, located against external walls and designed so that fresh air may be drawn from the coolest available source for distribution by overhead ducts to adjustable punkah louvres or diffusers near the work-place of each operator. In winter the air will need heating to prevent draughts.

7.14 The punkah louvres or diffusers should be located and designed so that in the vicinity of the operators the air velocity is sufficient to give a sensation of cooling in summer but without draughts in winter. A velocity of 77cm/sec—127cm/sec in the vicinity of operators is acceptable. Diffusers should also be located to ensure that air is discharged at head and arms rather than at the legs or feet of operators and that they are not masked by equipment or fixtures. They should be capable of adjustment to suit individual requirements. The volume of air supply from this system to each operator work-place will be governed by local heat radiation conditions.

7.15 The use of ventilation hoods over the calender(s) for the removal of vapour formed as the articles are being dried is not recommended. They radiate heat and can produce unsuitable working conditions. Calender design which incorporates suction rollers and suction fans considerably reduces the discharge of vapour into the laundry atmosphere by discharging the vapours outside the laundry building. Water drains should be provided to dispel condensed water vapour.

7.16 Normally tumblers take their air supply from within the building and discharge through ductwork to atmosphere. There should be provision for cleaning these ducts and associated lint traps and they can be lagged to minimise heat radiation. The outlet vents from tumblers, calenders or any other finishing units should be protected against wind and rain but without restricting excessively the air discharge.

7.17 In winter it is necessary to avoid cold draughts which can arise from air being exhausted from the building by drying tumblers and calenders etc. The air displaced by these units may be wholly or partially balanced by the supply air fans and heater units which serve the individually operated ventilation system which needs to be designed with this additional function in mind. A careful assessment will also need to be made having regard to individual conditions as to whether any further heating provision will be required in winter.

7.18 The ventilation system for the production area outlined in the preceding paragraphs when carefully designed in relation to process and solar heat gain should provide the flexibility needed to ensure satisfactory environmental conditions in all seasons. Under hot summer conditions it will permit large volumes of fresh air to enter the building at high and low level and provide a cooling effect to the operators before the air gains heat and is extracted. With the large volumes of air extracted when all extract fans are in operation random vigorous air movement can be achieved at operator level augmented by the individually operated air supply to all operators in areas of high heat radiation. In winter some of the external fans can be switched off and a much smaller volume of fresh air admitted through the high-level louvres, the low-level louvres being closed. This will flow towards ground level due to its higher density and become entrained with hot air rising from hot equipment to provide conditioned air at working level. Many combinations of louvre setting and fan switching will be possible to match the varying day-to-day weather conditions. Automatic control of the louvres and extract fans should not be provided as manual control by operators is more economic in use and is more acceptable by operators.

7.19 It has been suggested that as this type of ventilation system introduces larger volumes of unfiltered air there is the possibility of depositing solids and vapours in the building and that a degree of short circuiting between high-level louvres and roof-mounted fans will take place. Problems of this nature have not significantly been encountered where similar ventilation systems are operating and should be discounted. However, where there is local heavy atmospheric contamination a careful assessment will need to be made as to whether any special precautions are required in this respect.

7.20 A mechanical extract fan with a duct having inlets near the loading station of each washing machine in the central disinfection area should be provided. Extract fans will be required in the soiled storage area and supply air/fan heater units will be required in the classification area.

7.21 Simple mechanical extract arrangements will be required in the dry cleaning room to remove fumes of perchlorethylene or other solvents. It may be necessary for the solvent bearing air from the low-level extracts

to be passed through the recovery unit before being vented to atmosphere. Statutory requirements should be followed and relevant economics of recovery should be evaluated. The extract should normally be taken above the roof level of the laundry and adjacent buildings and away from windows and other air inlets. Air inlets may be provided behind heating convectors at high level on the side of the room opposite the low-level extract. A ventilation rate of 10/15 air changes per hour should normally be adequate in the dry cleaning room.

7.22 Internal rooms should be mechanically ventilated to suit individual requirements. Internal lavatories will need mechanical ventilation and may need to have duplicate extract fans. Ten air changes per hour will usually be adequate for most other internal rooms.

7.23 The fan motors of roof-type extract units should be of a continuously rated weatherproof type. Extracts and supply fans should be individually switched and have a red indicator lamp on the control gear to show when the fan is running. The controls for all fans serving principal sections of the ventilating system can be grouped in a console to facilitate the operation and adjustment of the ventilation in a given area. In the event of fire, in order to remove excessive smoke accumulation, the smoke detection system should incorporate means of initiating the start-up of the extraction fans. In these circumstances it would be an advantage to arrange for these fans to be operated in zones.

7.24 The noise level of extract and supply fans should comply with the requirements of paragraph 7.34.

7.25 Where supply air/heater units draw their air at roof level it is essential to ensure that their inlets are adequately spaced from any extract fan or source of fumes or heat.

7.26 The roof structure should be designed to provide safe access to roof extract units.

Tumbler dryer exhausts

7.27 It is preferable for drying tumbler exhausts to be taken individually to discharge above roof level terminating with a filter unit. The exhausts from tumblers of loading capacity below 90·7kg may be taken in pairs to join at filter units but for 90·7kg capacity tumblers and above it is recommended that the exhausts should be taken to atmosphere individually. The system resistance of the ductwork and the filter unit design must take into account the tumbler manufacturers' requirements regarding maximum allowable static pressure at the exhaust air outlet of the tumbler. The roof structure supporting the filter units must be adequate and allowance made for easy access for maintenance. Care must be taken to avoid filter air outlets discharging in close proximity to fresh air inlets of the ventilation system.

Steam and condensate service

7.28 The steam supply may be taken from central services. Consideration should be given to the possible overall economy which may be achieved by the provision of an independent boiler house for the laundry especially where the existing steam raising plant is suitable for the hospital but inadequate for the laundry. The pressure should not be less than 7 bar g at the laundry but pressures of up to 10 bar g are more appropriate for modern calenders, tumblers and some finishing units. The steam should be as dry as possible. A reduced pressure steam supply may be required for washing machines and will need to be selected to suit peak demand. Reducing valves should be specially selected for the wide range of load which they may be called upon to supply and to meet dead-end conditions without pressure build-up. On the low pressure side of each reducing valve a safety valve must be fitted and its discharge taken to a safe position. Steam mains should be properly drained and trapped and all steam services should be efficiently lagged. The lagging should be protected in places where it is liable to be damaged.

7.29 The importance of efficient steam trapping and removal of air cannot be overstressed. Branches supplying steam to the machines should be taken from the top of the steam main, and steam receivers should be trapped individually with the exception of the head and buck of pressing machines which may be trapped collectively. A system of condensate return by gravity discharge from the traps to a condensate receiver and pumping unit is generally preferable to a system using lifting traps. Condensate at the presses, supplied via small condensing units, may be used for damping articles as an alternative to atomised sprays using cold water and compressed air.

Cold, drinking and hot water services

Cold water

7.30 There must be an adequate supply of mains cold water and this may require the provision of a supply which is separate from that of the remainder of the hospital complex. The total water storage capacity required to serve the laundry will need to be considered having regard to the requirements of the water supply authority and any limitations on availability from the source. Where a water-softening plant is installed (see paragraphs 4.29—4.32) soft water storage equivalent to four hours supply will normally be suitable. This together with a header tank for washing plant (see paragraph 4.26) will provide a total storage of softened water equivalent to five hours supply. In addition raw water storage may be required and this will need to be determined in the light of water storage elsewhere. It is important that the flow rates from the header tank to the washing machines permit full dip for rinsing to be attained in not more than one minute. Water supply from the raw water storage tank will be required for the mess-room sink, lavatory basins, and central disinfection area. Normal pillar taps should be provided for lavatory basins and sinks. A small supply of soft water

may be required for the damping of articles in the press finishing section. This is used in conjunction with compressed air to give an atomised spray; alternatively condensate may be used (see paragraph 7.29.) A hosing-down point with water at suitable pressure will be required at the main wash areas and central disinfection area. Cold water pipes passing through warm humid areas should be suitably insulated to prevent condensation.

Drinking water

7.31 Drinking water points served directly from the service mains or from protected service tanks should be provided near the lavatory basins and also in the mess-room. Further drinking water points may be required near calenders and presses and in the rest-room; chilled water is preferable in these positions.

Hot water services

7.32 The temperature and quantity of hot water will depend on the type of washing system employed. It may be convenient to take the supply from the hot water services of the hospital or other establishment, provided that it is consistently less than 57 ppm as $CaCO_3$ hardness. If the hot water is produced at the laundry either by an independent boiler or by a calorifier supplied by steam from another source, the heating of the water can sometimes be augmented by the use of condensate from the steam-heated plant. This can often be the most economical solution where the steam boiler house is a great distance from the laundry. The extra cost of treating the make-up water at the boiler house should, of course, be taken into account when assessing the relative economy. The manner in which heat in the condensate is utilised will depend upon the relationship between the quantity and temperature of hot water required and the quantity of condensate available. If the demand for hot water is sufficient to utilise all condensate, storage pattern calorifiers heated by this condensate will be suitable, provided a thermostatically-controlled live steam booster is incorporated in the system to cover the starting-up needs. If the quantity of heat available from the condensate is greater than that required by calorifiers, it is preferable for the excess to be utilised to heat water in the cold water storage tanks.

Compressed air

7.33 Compressed air is used extensively for equipment such as presses, hoists, automatic controls for washing machines and for cleaning points adjacent to machinery. The air compressors, coolers and receivers should be located in the plant room. Wherever possible the air intake should be outside the building and should be fitted with a silencer and filter located where it will not be affected by rain, snow, ice, dust, fumes or noxious vapours. In order to give a stand-by service the air should be supplied by at least two compressors each with a total output equal to the maximum air demand plus, say, 10 per cent. This demand can only be calculated when the air requirements of the main items of plant have been established. The compressors should be complete with all necessary fittings, including an automatic unloading device, controls and suitable drainage. Normal working pressure is from 5·5 to 7 bar g. Each air cooler and each air vessel should be fitted with an automatic drain tap and by-pass valve for manual draining. The drains should be led via tundishes to the nearest gulley. Compressed air pipelines should be laid to suitable falls and water drain points should be fitted for each machine or group of machines to ensure removal of water. Strainers and oil and water taps must be fitted to each drop leg serving the machines. If water separators are not provided with individual machines these should be fitted in suitable positions on individual supply lines. Mist lubricators should be fitted in the air lines as required. Under no circumstances should medical compressed air supply be connected to a laundry service.

Noise level

7.34 Designers should ensure, by use of the various practicable and economical means of noise control available, that the general noise level with all plant operating does not exceed 85 dBA at distances greater than 1m from any individual piece of machinery. Attention must be paid to the noise levels in the plant room and laundry. With the plant operating under its noisiest condition, its mean near field sound level when measured on a hemisphere of a reference radius 3m centred on the geometric centre of the equipment shall be determined from the mean of at least 5 readings made in accordance with BS 4196. All plant and ancillaries which are not directly required to operate the equipment under test should be inoperative.

7.35 The maximum mean noise level acceptable must be reduced depending on the number of noisy machines which will run concurrently in the laundry. The following table gives guidance of the values:

Number of noisy pieces of equipment which will operate at any one time	*Maximum permissible mean noise level from any one plant to ensure that exposure is not exceeded (dBA)*
1-2	82
3	80
4-5	79
6	78
7 or more	77

Electrical installation

General

7.36 The electrical installation should include wiring and equipment for power, general and special lighting, heating, ventilation, socket outlets, controls, telephones and clocks. Guidance on factors affecting the supply and distribution arrangements is available in Hospital Technical Memorandum No. 7, Electrical Services: Supply and Distribution. Standby generation also needs to be considered and Hospital Technical Memorandum No. 11, Emergency Electrical Services, applies.

7.37 The electrical supply should be medium voltage 3-phase, 4 wire 50 Hz provided by either a sub-main circuit from the main intake and distribution centre, or by a separate feeder from the main incoming sub-station to the M.V. switch-room suitably placed within the laundry (see paragraph 4.23). Where a large laundry is sited as an independent unit, the economics of a high voltage supply should be examined. The M.V. switch-room will be required to house the incoming main circuit breaker/isolator, the incoming emergency supply and any necessary change-over equipment. The electrical distribution switchgear room will house the local switch-gear and distribution fuse boards and should be positioned away from washing areas. Motors and their associated starters and isolators situated in the production area should be weather-proof construction. For other internal areas the installation should follow normal industrial practice.

7.38 Power factor correction equipment is not included in this Note but where a power factor penalty exists, and is likely to operate, it will usually be economical to install power factor correction equipment which should be accommodated in the M.V. switch-room.

7.39 Distribution fuse-boards should be centrally placed to minimise the length of circuit wiring. They should be reasonably accessible and either fitted with locks or located in a room which is normally kept locked. Space should also be allowed for future additional units. HRC fuses are recommended and spare ways and fuses should be provided. Metal trunking and conduit with PVC insulated cables is suitable for the power supply to the machines. Exposed trunking and conduit must be galvanised. There may be advantages in the use of mineral insulated copper covered PVC sheathed cables in some sections of the productive area of the laundry. It is recommended that wiring in connection with fire detection apparatus and extract ventilation fans used for fire precaution purposes should be in M.I.C.C.

Power

7.40 It is essential that all power machines should be adequately earthed in accordance with the current edition of the Regulations for the Electrical Equipment of Buildings published by the Institution of Electrical Engineers. A separate isolator with suitable identification should be fitted adjacent to any machine not supplied with a combined isolator-starter. Fixed equipment (including motors) rated up to 13 amps and requiring a single phase supply should be permanently connected to 13-amp fused spur boxes. Similar equipment rated in excess of 13 amps should be fixed and permanently connected to separate final sub-circuits and should be independently switched. Trailing control cables used in conjunction with overhead conveyor hoist systems, etc. should be adequately protected. Their contactor-starters should be complete with overload and earth leakage protection and the voltage of their operating coils and any control push-buttons should not exceed 50 volts AC. Special arrangements will be necessary for the operation of extract ventilation fans when used for fire purposes.

Socket outlets

7.41 All socket outlets should be of 13-amp rating, switched and shuttered, and those installed in the productive area should be metal-clad and of splash-proof construction. A neon indicating light is required at the outlet if a non-luminous heating appliance is to be used.

7.42 The suggested twin socket provision is given in Table 2.

TABLE 2

	Laundries 55,000 and 120,000 articles weekly	*Laundries 180,000 and 250,000 articles weekly*
Reception, sorting and classification, calendering, assembling, packing and despatch areas	2	3
Pressing area	2	2
Engineers' store/workshop	2	3
Central disinfection area, main linen store, special personal clothing section, dry cleaning room, rest room, cleaners' room, staff entrance, water softening plant room	1	1
Offices	1 Twin per office	
Linen repair room	To suit number of machines and appliances plus 1 for future requirements*	
Calorifier and associated plant room and M.V. Switchroom	1 Twin	2 Twin
Electrical Distribution Switchroom, Compressor plant room and Standby generator room	1 Twin	1 Twin
Mess room	To suit the number of appliances plus 1 for future requirements (outlets should include indicating lights)	
Corridors	Single outlets to allow the use of floor cleaning machines on the basis that flexible leads on these need not exceed 9m in length.	

*Particular care is required in the siting of these outlets to avoid trailing floor leads and to allow for the re-arrangement of sewing machine positions.

Standby electrical generation

7.43 The capacity of the standby generator shall provide for 100 per cent load coverage. The acceptable limits of momentary fluctuations of voltage and frequency will depend upon the drop-out voltage of the contactor coils and relays, the ability of the accelerator motor producing the peak to accelerate at an acceptable rate and a not excessive dip in illumination from lighting fittings.

Lighting

7.44 The recommended average values of general illuminance measured at 0·85m above floor level and the limiting glare index for these rooms are given in Table 3.

7.45 An even distribution of illuminance is desirable. All working areas, instrument panels and control positions should be well lit and reasonably free from glare. Luminaires in the productive area and external areas should be drip-proof and have smooth external surfaces to facilitate maintenance and cleaning. Fluorescent fittings should be provided for general lighting. Tungsten filament lighting may be suitable for some rooms in the non-productive area. Switches controlling the lighting in the working areas should be splash-proof and should give flexibility of control.

Telephones and intercommunications

7.46 Telephones for internal and external calls will be required in the laundry manager's and assistant laundry manager's offices. A limited intercommunication system will also be required in laundries of 120,000 articles weekly and upwards permitting communication between the manager's office, reception and packing areas, the central disinfection area and the clean area. If the laundry is on a hospital site, the telephones will normally be extensions from the hospital exchange. A public call-box or booth may be provided in or near the entrance for use by staff, with coin-operated telephones connected to the public exchange.

Electric clocks

7.47 Clocks will be required in the laundry manager's office and at each end of the production areas. The hospital central clock system should be used if available; otherwise synchronous electric or battery clocks should be provided. A time-recording clock and rack will be required adjacent to the staff entrance.

Radio/loudspeaker system

7.48 There should be facilities for relaying music in the laundry. The control unit which can be equipped to serve as a staff call system can be located in either the laundry manager's office, or general office. Any system can be an extension from the main hospital system. The system should be such that relays can be heard above the noise generated in the area.

Fire alarms and fire fighting equipment

7.49 Information on fire alarms and extinguishers and on special precautions appertaining to laundries is given in Hospital Technical Memorandum No. 16 (Fire precautions) and reference should be made to Hospital Design Note 2 (Protection Against Fire) and the forthcoming Guide to the Fire Precautions Act, 1971, No. 2 (Hospitals) being prepared by the Home Office. (see also paragraphs 2.14 to 2.16).

7.50 Automatic fire detection by ionisation type smoke detectors should be provided over the main production hall comprising tumbler drying, calendering, pressing and packing and despatch sections, linen store and repair room. The soiled linen sorting and classification area should be similarly equipped.

7.51 To assist the fire-fighting process provision should be made for smoke removal by the installation of automatic roof ventilators and/or provision made for the alarm system to switch on automatically the roof extract ventilation system.

7.52 Where the laundry forms part of a whole hospital complex the detection systems should be wired to a hospital telephone exchange system or connected into the system existing within the hospital. In all other cases the system should be wired to the Fire Brigade Headquarters through a rented GPO line.

Lightning protection

7.53 The need for lightning protection should be assessed in accordance with British Standard Code of Practice CP 326-1965 Protection of Structures against Lightning.

TABLE 3

	Average value of illuminance (lux)	*Limiting glare index*
Washing, calendering, drying and dry cleaning, central disinfection, reception and classification, assembling, packing and despatch, main linen store, personal clothing section and engineers' store/workshop	200	25
Offices	200	19
Pressing, linen repair room	250	25
Mess room, rest room, barrier room, cleaners' room, laundry stores, cloakrooms and lavatories, solution preparation and storage area	100	—
Staff entrance and corridors, calorifier and associated plant room, switchrooms	80*	—
Water softening plant room	70*	—

*at floor level

8. Cost and other relevant information

Cost control

8.1 For cost control purposes the lump sum Cost Guide figures for the various functional units shown in the Departmental Cost and Area Guide (Hospital Building Procedure Note 6: part of CAPRICODE), will be applicable. These figures include basic accommodation together with circulation and an allowance in respect of additional accommodation and/or additional engineering.

8.2 Building Notes recommend the levels of accommodation and services for hospital departments which the Department of Health and Social Security consider it reasonable to provide. Health Authorities are at liberty to depart from the design recommendations given in Building Notes provided they are satisfied that the levels of accommodation and services they adopt are adequate. The Departmental Cost allowance however is to be regarded as the maximum sum available for a laundry department requiring the basic services specified in this Note. Health Authorities are encouraged to produce designs for the provision of appropriate accommodation and services at a cost less than the Departmental Cost Allowance.

8.3 The Laundry Cost Guide figures provide for the basic and additional accommodation detailed in paragraphs 4.1 to 4.35 above and for the engineering services detailed in paragraphs 7.1 to 7.53.

Apportionment of costs

8.4 An assessment of the notional cost apportionment between the building and engineering service elements should be made at Procedural Stage C1 (Provisional Cost Plan—Hospital Building Procedure Note No. 1: Part of CAPRICODE).

Circulation space

8.5 For the purpose of preliminary planning the area occupied by internal circulation space and internal walls and partitions within the ancillary area represents, on average, an addition of 25 per cent to the net floor area of the ancillary area, basic accommodation. The area occupied by internal circulation space and internal walls and partitions within the production area is included in the areas of basic accommodation.

Small rooms

8.6 The plant room areas shown in paragraphs 4.36 to 4.40 are regarded as communication space. The areas have been calculated for a single department scheme and some reduction in the area should be possible in a multi-departmental development.

Engineering services

8.7 The following engineering services are included in the quoted costs of accommodation shown in the Departmental Cost Guide.

Basic accommodation:

(*a*) *Mechanical services:*

Heating	By steam to convectors in administration and domestic area, unit heaters in production, sorting and central disinfection areas, with radiant panels in packing area.
Ventilation	Mechanical supply and extract from production, sorting, and central disinfection areas. Personal controlled ventilation in pressing area.
Drinking water Cold water service to machines and domestic outlets	Mains supply from local storage tanks (including storage tanks).
Hot water service to machines and domestic outlets	From local calorifiers (including calorifiers).
Steam and condense	Services supplied from central supply.
Compressed air	From local compressor installation.
Soap and alkali	Services including mixing and storage tanks.
Fire protection	Supply from mains to hose reel points.
Water recovery system	Included for sizes 120,000, 180,000 and 250,000.
Emergency standby generator	Fuel and water piped services.

(*b*) *Electrical services:*

Lighting (including fittings), socket outlets, electric power supplies for Groups 1 and 2 equipment, wiring for mechanical services, main switchgear and meters, sub-mains and sub-distribution boards and switchgear. Emergency standby generator. Fire alarm system, clocks, radio programme distribution and staff call system and inter-communication system. Conduit wireways for telephones.

(*c*) *Equipment:*

All plant as listed in the schedule of plant—Appendix 4, plus standby generator including fuel tanks, cooker and water boiler.

Additional accommodation

Water softening plant room

Mechanical services:

Water softening plant with break tank, brine tank, pumps and inter-connecting pipework.

Electrical services:

Lighting (including fittings), socket outlets, electric power supplies for water softening plant.

Water storage

Mechanical services:

Tanks for five hours storage with pumps as required.

Electrical services:

Lighting (including fittings), electric power supplies to pumps.

Bagged dry salt store

Mechanical services:

Steam radiator panel heating.

Electrical services:

Lighting (including fittings), socket outlet as necessary.

Slurry salt store

Mechanical services:

Slurry tank, cold water service, heating by steam radiator panels.

Electrical services:

Lighting (including fittings).

Engineers' store

Mechanical services:

Heating by steam radiator panels, hot and cold water.

Electrical services:

Lighting (including fittings), socket outlets.

Linen repair room (Dressing cubicle)

Mechanical services:

Heating by steam radiator panels.

Electrical services:

Lighting (including fittings).

Supplementary accommodation:

Infants' napkin section

Mechanical services:

Heating by steam unit heaters, extract ventilation, compressed air, steam and condense, hot and cold water supply, soap and alkali.

Electrical services:

Lighting (including fittings), socket outlets, electric power supplies to Groups 1 and 2 equipment, fire alarms and radio loudspeaker.

Equipment:

Drying tumbler and conveyor.

Dry cleaning section

Mechanical services:

Heating by steam convectors, ducted extract ventilation, compressed air, steam and condense, cold water, solvent tank.

Electrical services:

Lighting (including fittings), socket outlets, electric power supplies for Groups 1 and 2 equipment, fire alarms and radio loudspeaker.

Equipment:

All plant as listed in the schedule of plant Appendix 5.

Special personal clothing section

Mechanical services:

Mechanical extract ventilation, personal controlled ventilation, domestic hot and cold water services, steam and condense, cold water service to machines, compressed air.

Electrical services:

Lighting (including fittings), socket outlets, electric power supplies for Groups 1 and 2 equipment, fire alarms and radio loudspeaker.

Equipment:

All plant as listed in the schedule of plant—Appendix 6.

(Costs of the above engineering services in supplementary accommodation assume supplies are derived from the main laundry.)

Storage for linen at sending hospitals

Services include heating by low-pressure hot water flush mounting radiators and lighting (including fittings).

Communications

8.8 The following engineering services should be provided in the areas allocated to communications—plant space:

Lighting, general purpose socket outlets and heating for frost protection.

APPENDIX 1

Treatment for fouled/infected linen

Extracts from Medical Supplies Working Party's Report

(i) ***Categories of linen***

All fouled linen and garments are potentially infected and should be treated as infected, so that only two categories are required—"fouled and infected" and "soiled" (neither fouled nor infected). Babies' napkins would be included in the former category. Garments normally dry cleaned that are classified fouled/infected will be thermally disinfected using the normal process, after washing and extraction they will be passed to the dry cleaning unit for finishing.

(ii) ***Soiled linen***

The washing process should include a disinfecting stage in which the temperature is maintained at 65°C for 10 minutes or at 71°C for 3 minutes. For small machines of conventional design and degree of loading, 4 minutes should be added to these times to allow for "mixing time". For large machines or heavy loading it may be necessary to add up to 8 minutes to these times. Continuous washing machines and other machines of new design which incorporate novel washing processes should be considered individually to determine satisfactory thermal disinfecting conditions for each type and to ensure that there is no possibility of excessive re-contamination after the disinfecting stage. All washing machines should be fitted with accurate thermometers of which the sensing elements are correctly placed to register the temperature of the load and these thermometers should be checked at frequent intervals.

(iii) ***Fouled and infected linen***

Fouled and infected linen with the exception of certain special categories (see below) should be placed in waterproof containers immediately on being removed from a bed. After securely closing the neck of the bag it should be taken to a "Central Disinfection Area" where the contents should be tipped into an appropriate washing machine.

In future planning of hospital laundries provision should be made for a section of the soiled side to be this central disinfection area. It should be physically separated by a barrier from the remainder of the soiled side and from the clean side of the laundry. One or more double-ended washing machines should be provided in the barrier between the central disinfection area and the clean side.

Infected linen should be sluiced (if fouled) and washed in these double-ended machines, using the times and temperatures given in paragraph (ii) above to achieve disinfection. The clean disinfected work should be unloaded from the washing machine on the clean side of the laundry and join the normal flow of work for hydro-extraction and finishing.

The times and temperatures recommended in paragraph (ii) above are adequate for disinfection of most vegetative bacteria and viruses. Special arrangements will be required however in the following circumstances:

(a) Smallpox

Arrangements for disposal of infected linen have been dealt with in the "Memorandum on Control of Outbreaks of Smallpox (1964)".

(b) Anthrax

Articles contaminated with anthrax should be autoclaved before being sent to the laundry.

(c) Typhoid

Infected linen from typhoid patients should be discarded into solubly stitched plastic bags. On arrival at the central disinfection area the whole bag should be put into the washing machine intact so that after leaving the ward the linen is not handled again until it has been disinfected.

(d) Infective hepatitis

In the event of outbreaks of infective hepatitis the washing temperature should be increased to a minimum of 93°C for 10 minutes to which should be added the appropriate allowance for "mixing time".

(e) Other exceptional circumstances

Although these suggestions cover most situations, the choice of disinfection procedure must remain the responsibility of the medical staff concerned if exceptional circumstances arise.

(iv) ***Babies' napkins***

All babies' soiled napkins should be treated as infected.

(v) ***Barrier planning of laundries***

It is suggested that the central disinfection area should be separated from both the clean side of the laundry and the reception area for soiled linen. Apart from the possibility in larger laundries of a barrier to separate the clean side of the napkin area from the rest of the clean side no other barriers are thought necessary. Since all fouled linen will be dealt with in the central disinfection area there will be no further need of a separate central sluicing point.

(vi) ***Containers for infected linen***

Containers should be waterproof, strong, cheap (or disposable) and light to carry. Heavy gauge polythene bags are often used but they are expensive if treated as disposable and difficult to disinfect for re-use. It is also difficult to disinfect the outside of a polythene bag. Light gauge disposable polythene bags (120-gauge polythene should meet requirements) are cheaper but easily torn although this difficulty can be overcome by enclosing the filled bag in a canvas or nylon outer bag. The latter would be washable and coloured or marked to identify the contents. Rigid plastic bins are a possible alternative but they are heavy and disinfection presents a problem. Alginate stitched plastic bags are an attractive method but are probably too expensive at present for general use, although they should be used for linen from patients with typhoid.

APPENDIX 2

Schedule of accommodation

LAUNDRY

The following is a guide to the accommodation required: modifications may need to be made to the areas of the main accommodation, having regard to the particular requirements of a scheme and the type of plant selected.

Laundry capacity:				
(i) Articles weekly	55,000	120,000	180,000	250,000
(ii) Dry weight weekly @ 0·4 kg per article±0·012 kg	22,000	48,000	72,000	100,000

	Areas in square metres			
Basic accommodation				
(a) Production area (including circulation)				
(i) Central disinfection area	60	92	118	161
(ii) Reception, storage, classification and monorail elevator shaft	212	460	639	894
(iii) Washing, extraction, drying, calendering and pressing	409	784	1,199	1,490
(iv) Assembling, packing and despatch bay	181	383	558	790
(b) Ancillary area				
Staff entrance	16	16	16	16
Staff lavatories and cloakrooms				
(i) Male	12	15	17	20
(ii) Female	40	72	100	130
Barrier room	6	6	6	6
Mess room	30	51	77	98
Rest room	8	8	11	11
Offices	21	45	50	50

APPENDIX 2 (continued)

Laundry capacity: Articles weekly	55,000	120,000	180,000	250,000
	Areas in square metres			
(b) Ancillary area (continued)				
Washing materials store	11	20	30	40
Machine clothing store	8	8	11	14
Solution preparation and storage area	11	12	17	23
Linen repair room	24	48	72	100
M V switch-room	10	11	11	12
Electrical distribution switchgear room	4	6	9	12
Cleaners' room	7	9	10	11
Circulation 25%				
(c) Space for tanks				
Header tank (1 l/hour)	20	31	39	48
Water recovery header tank	—	19	21	26
Pit for water recovery tank	—	14	16	19
Additional accommodation (including circulation)				
Water softening plant room	8	9	11	13
Water storage (4 hours)	32	53	73	95
Bagged dry salt store	8	9	14	18
slurry store	16	16	16	16
Engineers' store	9	14	19	24
Linen repair room (dressing cubicle and hanging space)	5	5	5	5
Communications (including circulation)				
Calorifiers and associated plant room	17	34	47	59
Compressor plant room	35	41	47	54
Standby generator	39	42	54	59
Oil storage (standby generator)	26	32	36	38

APPENDIX 3

Schedule of supplementary accommodation

1. INFANTS' NAPKIN SECTION

Laundry capacity: Articles weekly	55,000	120,000	180,000	250,000
	Areas in square metres			
Infants' napkin section	—	61	61	61

2. DRY CLEANING SECTION

Dry cleaning capacity:				
(i) Dry weight weekly kg	600	950	1,450	2,400
(ii) Dry cleaning machine capacity per load kg	11·5	18	27	45
	Areas in square metres			
(a) Production area*	49	65	93	140
(b) Store	3	4	4	5
(c) Solvent storage tank	2·5	2·5	2·5	2·5
Total	54·5	71·5	99·5	147·5

* circulation space included

NOTES:

1. Storage space is required for stock of filter powder chemicals etc. It may be combined with the washing materials store of a laundry.
2. The area allowed for solvent storage is sufficient for temporary storage of sludge residues from the dry cleaning machine pending disposal. This area will normally be outside the building.
3. Areas are based on the assumption that this supplementary accommodation will be integrated with the accommodation provided by the main laundry as shown in Appendix 2.

3. SPECIAL PERSONAL CLOTHING SECTION

Laundry capacity: Articles weekly	3,000/3,500	4,500/5,000	6,000/7,000
	Areas in square metres		
(a) Washing, drying, finishing	38	47	63
(b) Reception and despatch	26	36	49
Total	64	83	112

NOTES:

1. Circulation space is included.
2. Areas are based on the assumption that this supplementary accommodation will be integrated with the accommodation provided for the main laundry as shown in Appendix 2.

4. STORAGE FOR SOILED AND/OR CLEAN LINEN AT SENDING HOSPITALS
(see paragraph 2.10)

Clean linen

No. of beds	300	400	500	600	700	800	1,000	1,200
Area m²	44	70	80	90	100	100	129	145

APPENDIX 3 (continued)

Soiled linen

No. of beds	300	400	500	600	700	800	1,000	1,200
Area m²	24	30	40	50	60	60	80	95

NOTES:

1. These suggested areas are based on an average of 60 articles per staffed bed per week and on the assumption that a maximum of four days storage of linen will be required at any one time.
2. The areas include provision for the assembly of linen for distribution.
3. This suggested accommodation may be located within the hospital industrial complex, comprising boiler house, works department, central incineration, central stores etc.
4. The space for the main laundry store should be reduced by any additional space provided at the sending hospital on the basis indicated above. (See paragraph 4.50.)

APPENDIX 4

Schedule of plant

LAUNDRY

The following is a guide to the main items of plant required based on the work mix given in paragraph 3.5 and an average dry weight of 0·4kg per article. The schedule will need to be modified in the light of the make-up of workload, average weight per article, the type of plant and equipment selected and the proportion of the fouled/infected work to be processed.

Laundry capacity:				
(i) Articles weekly	55,000	120,000	180,000	250,000
(ii) Dry weight weekly at 0·4 kg per article ±0·012 kg	22,000 kg	48,000 kg	72,000 kg	100,000 kg
General wash:				
Continuous washing units with extractor and conditioning tumbler; capacity 550kg per hour	—	1	2	3
Washer-extractor, capacity 270kg per load	—	—	—	3
Washer-extractor, capacity 180kg per load	2	3	4	1
Washer-extractor, capacity 90kg per load	1	2	1	1
Washer-extractor, capacity 45kg per load	2	—	—	—
Fouled/infected wash:				
Washer-extractor, capacity 135kg per load	—	—	2	3
Washer-extractor, capacity 90kg per load	—	2	—	—
Washer-extractor, capacity 45kg per load	2	—	—	—
Calenders:				
4-roll (500/600mm × 3000mm)	1	2	3	4
Calender feeding equipment:				
Automatic feeder for large flatwork	—	—	1	2
"Spreader" for large flatwork	1	1	1	1
Suction feeding aid for large and small flatwork	1	2	2	2
Calender folding equipment:				
With cross-fold for larger flatwork only	—	1	1	2
With cross-fold for small flatwork only	—	—	1	1
With cross-fold for large and small flatwork	1	1	1	1
Sheet stacking machine	—	—	1	2

APPENDIX 4 (continued)

Laundry capacity: Articles weekly	55,000	120,000	180,000	250,000
Tumblers:				
Continuous conditioning tumblers		included with continuous washing units		
Batch conditioning tumbler, 90kg per load	—	—	—	2
Batch conditioning tumbler, 60kg per load	2	2	2	—
Batch drying tumbler 90kg per load	—	—	—	2
Batch drying tumbler 60kg per load	—	2	3	1
Batch drying tumbler 45kg per load	2	1	1	1
Presses and garment finishers:				
Cabinet garment press units	1	2	3	3
Rotating table pressing machines	3	3	4	5
Cabinet steam/air form finishers	1	1	2	3

Other equipment: Mono-rail and flat belt conveyors;
Weighing facilities; Loading hoppers;
Automatic controls and synchronising equipment for batch washing machines and for starch injection (when required);
Mixing and storage tanks for washing materials and pumps; (when required for their distribution)
Air compressors;
Calorifiers and hot water storage vessels;
Water recovery equipment;
Revolving racks for clean linen.

NOTES:

1. Where it continues to be necessary to wash woollen articles a two-speed drive type of machine with an interrupter gear will be required.

2. Dual-access or double-door type washing plant suitable for installing in a barrier wall will be required for processing the fouled/infected load. The plant schedule for this type of equipment is based on 10% of the total weight of work processed being fouled/infected and a re-appraisal of the plant requirement will be necessary if the proportion of the load under this category varies.

3. The washing plant and tumblers for conditioning and drying as scheduled are based on an average weight per article of 0·4 kg ± 0·012kg. Where the average weight falls appreciably outside this limit adjustments may need to be made to provide for lesser or greater total machine capacity.

4. Calenders of the deep bed type with 500mm/600mm diameter × 3000mm long rolls incorporating suction rollers and spring padding are generally recommended, but equally suitable machines could be considered.

5. Folding equipment—that specified is capable of making half and quarter folds in large and small articles together with cross-folds as indicated. Where appropriate the cross-folding machine should be suitable for coupling to a stacking machine.

6. Tumblers—all tumblers (except batch tumblers of 45kg capacity or less) whether they are used for conditioning or complete drying are for automatic loading and unloading.

7. Pressing machines and steam air form finishing units as scheduled should be regarded as a guide only. A final selection of finishing equipment can only be made in relation to the actual quantity and type of garments to be finished. The final choice of equipment must be made on the known details of the workload, and any foreseeable change in style and make-up of garments and future developments in finishing plant.

8. Further information on all types of machinery is given in Sections 5 and 6 of this guidance.

APPENDIX 5

Schedule of plant

DRY CLEANING SECTION

Dry cleaning capacity:				
(i) Dry weight weekly kg	600	950	1,450	2,400
(ii) Dry cleaning machine capacity per load kg	11·5	18	27	45
Dry cleaning machine (non-flam)	1	1	1	1
Garment presses	2	2	3	5
Steam/air form finisher	—	1	2	2
Spotting table	1	1	1	2
Air vacuum unit	1	1	1	1
Solvent recovery unit	1	1	1	1

Other equipment: Weighing facilities;
Simple "slick rails" for support and transfer of garments on hangers;
Solvent storage tank.

NOTES:

1. Garment presses are of the manually-operated type with free steam and vacuum facilities.
2. Steam/air form finishers are of the simple non-cabinet type and with fabric forms.
3. The solvent storage tank will normally be installed outside the building with easy access for filling from bulk supply vehicles.

APPENDIX 6

Schedule of plant

SPECIAL PERSONAL CLOTHING SECTION

Special personal clothing capacity: Articles weekly	3,000/3,500	4,500/5,000	6,000/7,000
Washing machines, 12kg capacity*	2	2	3
Washing machines, 6kg capacity*	—	1	1
Hydro-extractor, 12kg capacity	1	1	1
Hydro-extractor, 6kg capacity	—	1	1
Drying tumbler, 12/14kg capacity	1	2	2
Static drying cabinet	1	1	1
Garment press	—	—	1
Steam/air finisher	1	2	2

* The volume of the washing machine cage should be not less than 20 litres per kg of work.

Other equipment: Flat belt conveyor;
Soiled work classifier;
Sink(s) and draining board(s);
Spin dryer;
Hand iron and ironing board;
Packing table;
Compartmented rack(s).

NOTES:

1. The scale of provision is not for processing *all* garments for long-stay patients. It is to enable the laundering of those garments which are unsuited to bulk or semi-bulk treatment because of their type or the fabrics from which they are made. A careful assessment of need is necessary.
2. Washing machines are of the type which incorporate low-speed extraction fitted with automatic controls but arranged for manual addition of washing materials.
3. The static drying cabinet is for drip-dry garments and for woollen garments unsuited to tumbler drying.
4. The garment press may be of the rotating table type or a pair of scissors presses in tandem.
5. Washer-extractors of similar capacities to those indicated above are now available for use in a special personal clothing section.

APPENDIX 7

Service requirements

The following table is a guide to consumptions of steam, water and electricity to be assumed for the four sizes of laundry scheduled. This has been based on the plant and equipment given in Appendix 4. The final estimates of service consumptions must relate to the type of equipment ultimately selected to suit the particular laundry load and its make-up.

Laundry capacity:				
(i) Articles weekly	55,000	120,000	180,000	250,000
(ii) Dry weight weekly at 0·4 kg per article ±0·012 kg	22,000 kg	48,000 kg	72,000 kg	100,000 kg
Steam:				
Approx. hourly consumption kg				
High pressure	1,400	2,400	3,600	4,800
Low pressure 93°C wash	850	1,500	2,200	3,000
or 71°C wash	750	1,350	2,000	2,750
Water:				
Approx. total maximum hourly consumption (litres)—cold 60% hot 40%	12,000	25,000	37,000	50,000
Electricity:				
Units per hour (approx. 120 units per 1,000 kg dry weight)	80	175	260	360

NOTES:

1. The consumption of water, particularly in the case of larger laundries, is considerable and an assessment of water supply available from water supply authorities should be made. (See also paragraph 3.10.)

2. The drainage system should be designed to deal with the effluent from all machines without the risk of floor flooding. The effluent flow from batch type washing machines is usually assumed to be between two and three times the rate of flow of cold water supplied to the machines. When the washing machine sumps have to cope with a heavy flush of effluent due to simultaneous discharge, the higher flow rate (three times) should be taken for design purposes. For washing plant in the central disinfection area sealed drainage is necessary; open drainage will also be required to allow hosing down of the floor. The formation of a certain amount of lint during washing is unavoidable and this is discharged with the effluent. In order to avoid the possibility of the lint and other waste matter obstructing the drains, a sump complete with removable strainer between the discharge from the wash area and the drains should be provided. The strainer should be designed for convenient access and easy removal of waste matter. One spare strainer should be provided. The effluent from the laundry may be run into an existing hospital drainage system and it is therefore important that in the case of a new or enlarged laundry the total capacity of the drainage system should be carefully considered together with the elevation of the site in relation to the sewers. In some cases a holding tank for effluent may be needed. All statutory regulations must be followed (see paragraph 3.23.)

3. The low pressure steam consumption shown is based on a maximum temperature for the washing process of not less than 93°C; for lightly soiled work a temperature of 71°C may be employed with consequent reduced low pressure steam consumption. This lower temperature is sufficient to ensure that all vegetative organisms are killed, provided the temperature is maintained throughout the load. Where heavy machine loadings are employed (12.5 litres or less of machine capacity per kg dry weight of load) it will be necessary to prolong the washing process at 71°C to compensate for the time-lag in reaching this temperature at the centre of the load. (See paragraph 6.19.)

4. The low pressure steam and water requirements indicated in the schedule will be reduced by approximately 40% and 20% respectively if the washing machines form part of a heat and water reclamation unit.

5. Steam for the hot water service is included but not steam for space heating.

6. Supplies of both high pressure and low pressure steam will be required. High pressure steam (for finishing and drying plant) should be at a pressure of not less than 7 bar g. The low pressure steam supply (for washing machines) will not need to exceed 3—5 bar g unless a higher pressure is recommended by the manufacturers for specialised plant.

7. The figures for electricity consumption are inclusive of the requirements for heating, lighting and ventilation.

8. It is necessary for due consideration to be given to water conservation and energy savings in the final selection of plant and equipment.

HEALTH BUILDING NOTE (REVISED 1977) 25-LAUNDRY

CORRECTION

Page 29 (*Chapter 8*) *Paragraph 8.7*(*a*)

Item: Drinking water, cold water service to machines and domestic outlets.

The layout should be as for two separate items and should be shown as follows:—

Drinking water	Mains supply
Cold water service to machines and domestic outlets	From local storage tanks (including storage tanks)

May 1977

Department of Health and Social Security

London: Her Majesty's Stationery Office

CORRIGENDUM TO HN(77)65

PLEASE AMEND THE DATE OF THIS NOTICE TO READ
'JULY 1977'

DEPARTMENT OF HEALTH AND SOCIAL SECURITY

To: Regional Health Authorities)
Area Health Authorities) for action
Boards of Governors)

Community Health Councils - for information

May 1977

HEALTH SERVICES MANAGEMENT

HEALTH BUILDING NOTE NO 25 (REVISED)-LAUNDRY

SUMMARY

This Notice announces the publication of a revised Building Note on the design and equipping of hospital laundries.

HEALTH BUILDING NOTE NO 25 (REVISED 1977) – LAUNDRY

1. Health Building Note No 25 (revised 1977) – Laundry – replaces the corresponding Hospital Building Note issued in 1964. This particular Building Note will be the last to retain the traditional style. Future Health Building Notes, which will progressively replace Hospital Building Notes and kindred guides, will be in a new format.

2. The guidance in this Health Building Note reflects an economical combination of technical requirements consistent with the provision of a functionally adequate laundry although the standards and cost allowances will be found to be somewhat higher than hitherto. There are several reasons for this increase; defects and omissions in the previous guidance have been remedied, allowance has been made for an improvement in environmental standards, and due account has been taken of the need for additional capacity because of increased weight per article and the change in working hours. The new Building Note contains new and more up to date information which will be of particular interest to authorities who may be contemplating the improvement of existing laundries, an important option open to them considering laundry services at the present time. It is, of course, also applicable to the design and construction of new facilities. The recommendations of the Health Building Note may need to be modified or adapted to meet particular local requirements; for example, certain provision may be omitted if unnecessary locally.

COST ALLOWANCES

3. The Departmental Cost Allowances and Guide to Areas associated with Capricode (Hospital Building Procedure Note No 6 Appendix 7), are given in Appendix 'A' to this Notice. Other general cost information, which should be read in conjunction with Chapter 8 of the Building Note, is contained in Appendix 'B'. Like all Building Notes, the design recommendations can be departed from to produce accommodation and services at a cost less than the cost guide figures, provided Health authorities are satisfied that they are still at an adequate level.

DEPARTMENTAL COST ALLOWANCES AND GUIDE TO AREAS

Functional Unit	Departmental area (to nearest 5 m^2)	Cost Guide (to nearest £1,000)
	m^2	£
i. *Basic Accommodation*		
(number of articles per week)		
55,000	1,160	432,000
120,000	2,200	816,000
180,000	3,165	1,159,000
250,000	4,150	1,511,000
ii. *Supplementary Accommodation*		
Infants napkin section		
(number of articles per week)		
Over 10,000	60	19,000
Dry cleaning section		
(Kilogrammes per week)		
600	55	24,000
950	70	30,000
1,450	100	41,000
2,400	150	59,000
Special personal clothing section		
(number of articles per week)		
3,000/3,500	65	25,000
4,500/5,000	85	33,000
6,000/7,000	110	46,000
Storage at sending hospital		
(number of beds)		
300	75	9,000
400	110	13,000
500	130	15,000
600	155	17,000
700	165	18,000
800	175	19,000
1,000	230	25,000
1,200	265	28,000

COST AND OTHER RELEVANT DETAILS

COSTS GENERALLY

1. Building Notes recommend the levels of accommodation and services for hospital departments which are considered reasonable. Health Authorities are at liberty to depart from the design recommendations given in Building Notes provided that they are satisfied that the levels of accommodation and services they adopt are adequate. Health Authorities are encouraged to produce designs for the provision of appropriate accommodation and services at a cost less than the relevant cost guide figures.

2. The Cost Guide figures for the various functional units include basic accommodation together with circulation and an allowance in respect of additional accommodation and/or additional engineering. For guidance purposes the basic and other accommodation costs for laundries are as follows:-

Basic Accommodation

Laundry capacity of 55,000 articles per week	£425,500
" " " 120,000 " " "	£802,400
" " " 180,000 " " "	£1,139,500
" " " 250,000 " " "	£1,486,400

Additional Accommodation

Water softening plant room	£461 per m^2
Water storage (4 hours)	£158 " m^2
Bagged dry salt store	£139 " m^2
Slurry salt store	£338 " m^2
Engineer's store	£146 " m^2
Linen repair room (Dressing cubicle)	£141 " m^2

Supplementary Accommodation

Supplementary accommodation basic costs are synonymous with the cost allowances quoted in Appendix A. No additional accommodation allowance is involved in the case of supplementary accommodation.

APPORTIONMENT OF COSTS

3. For assessing a notional cost apportionment between the building and engineering service elements at Procedural stage 3A (Notional/Provisional Cost Plan) the following percentages should be applied:

	Building elements %	Engineering services elements %	Allocation as design develops %
Basic Accommodation	37	57	6
Additional Accommodation			
Water softening plant room	32	62	6
Water storage (4 hours)	27	67	6
Bagged dry salt store	69	25	6
Slurry salt store	38	56	6
Engineer's store	65	29	6
Linen repair room (Dressing cubicle)	80	14	6
Supplementary Accommodation			
Infants napkin section	39	55	6
Dry cleaning section	33	61	6
Special personal clothing section	34	60	6
Storage at hospitals	79	15	6

4. The 6 per cent reserved from the cost plan for use as design develops is intended to help to produce the best design solution. The way in which it should be used in the building and engineering cost plans is a matter for decision by the project team as a whole.

COMMUNICATIONS – PLANT SPACE

5. Plant room areas required for a single department scheme, (eg laundry only) have been calculated and are set out below; some reduction in area should be possible in a multi-departmental development (laundry in conjunction with other provision):-

	Articles per week			
	55,000 m^2	120,000 m^2	180,000 m^2	250,000 m^2
Calorifiers and plant room	17	34	47	59
Compressor plant room	35	41	47	54
Standby generator	39	42	54	59
Oil storage	26	32	36	38

Department of Health and Social Security
Welsh Office

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Health/Hospital Building Notes

4	Ward units (revised 1968)	£1
12	Out-patient department	95p
15	Pathology department (revised 1973)	60p
20	Mortuary and post-mortem room	17p
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The Building Notes listed below are now out of print but remain relevant to Health Building.

6 Diagnostic x-ray department
10 Kitchens
11 Dining rooms
13 Central sterile supply department
14 Training school for nurses
16 Boiler house and steam boiler plant
18 Administrative department
19 Department of medical photography and medical illustration
21 Maternity department
23 Children's ward

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25	Laundry	T.O.P.
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29	Pharmaceutical department	48p
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Printed in Wales for Her Majesty's Stationery Office
by Qualitex Printing Limited Cardiff
Dd. 290389 K40 4/77

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